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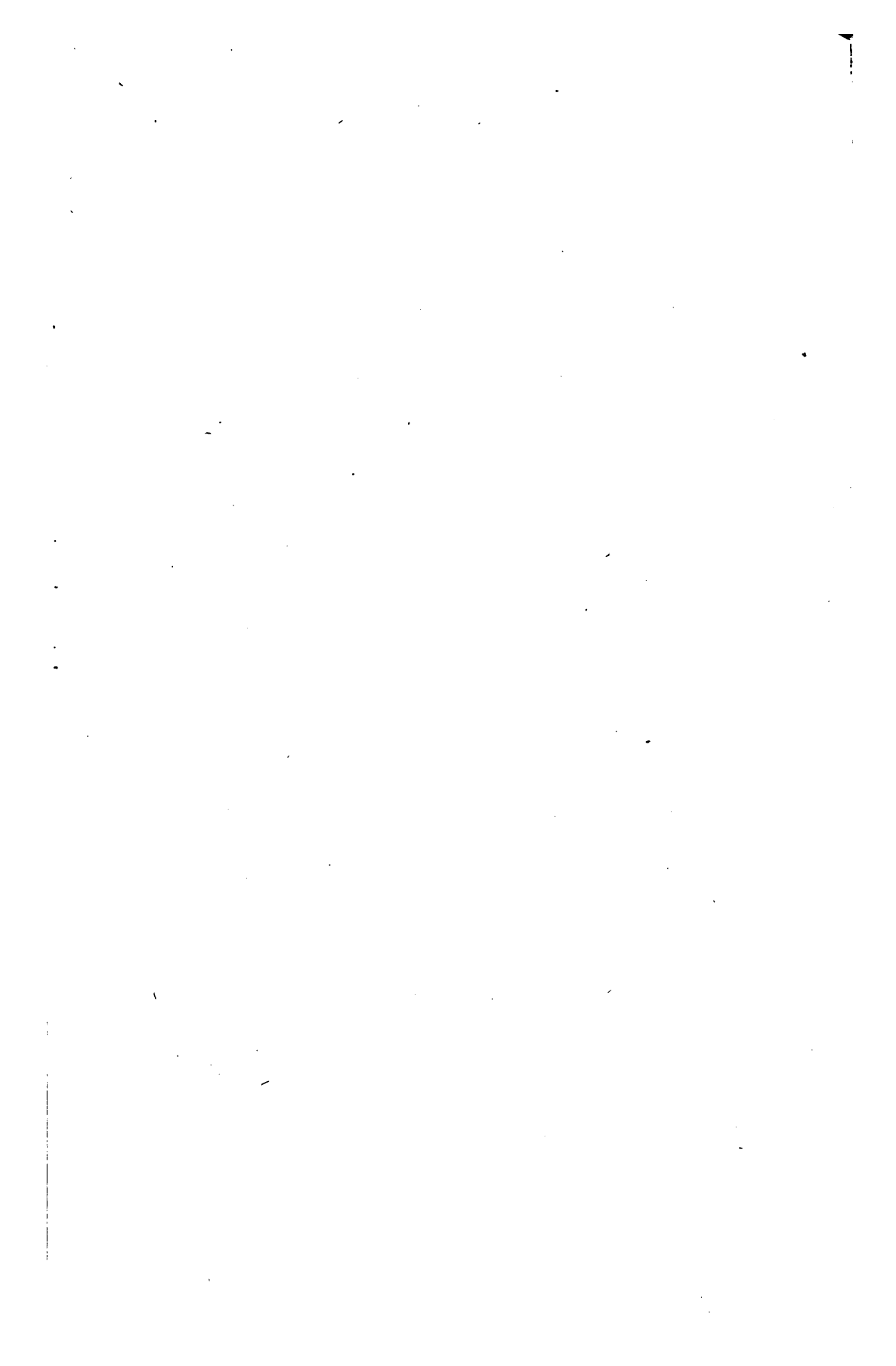
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H. O. No. 155

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# THE BLACK SEA PILOT

THE DARDANELLES, SEA OF MARMARA,  
BOSPORUS, BLACK SEA, AND  
SEA OF AZOV

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FIRST EDITION

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PUBLISHED AND SOLD BY THE HYDROGRAPHIC OFFICE  
UNDER THE AUTHORITY OF THE  
SECRETARY OF THE NAVY

PRICE, 90 CENTS



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1920

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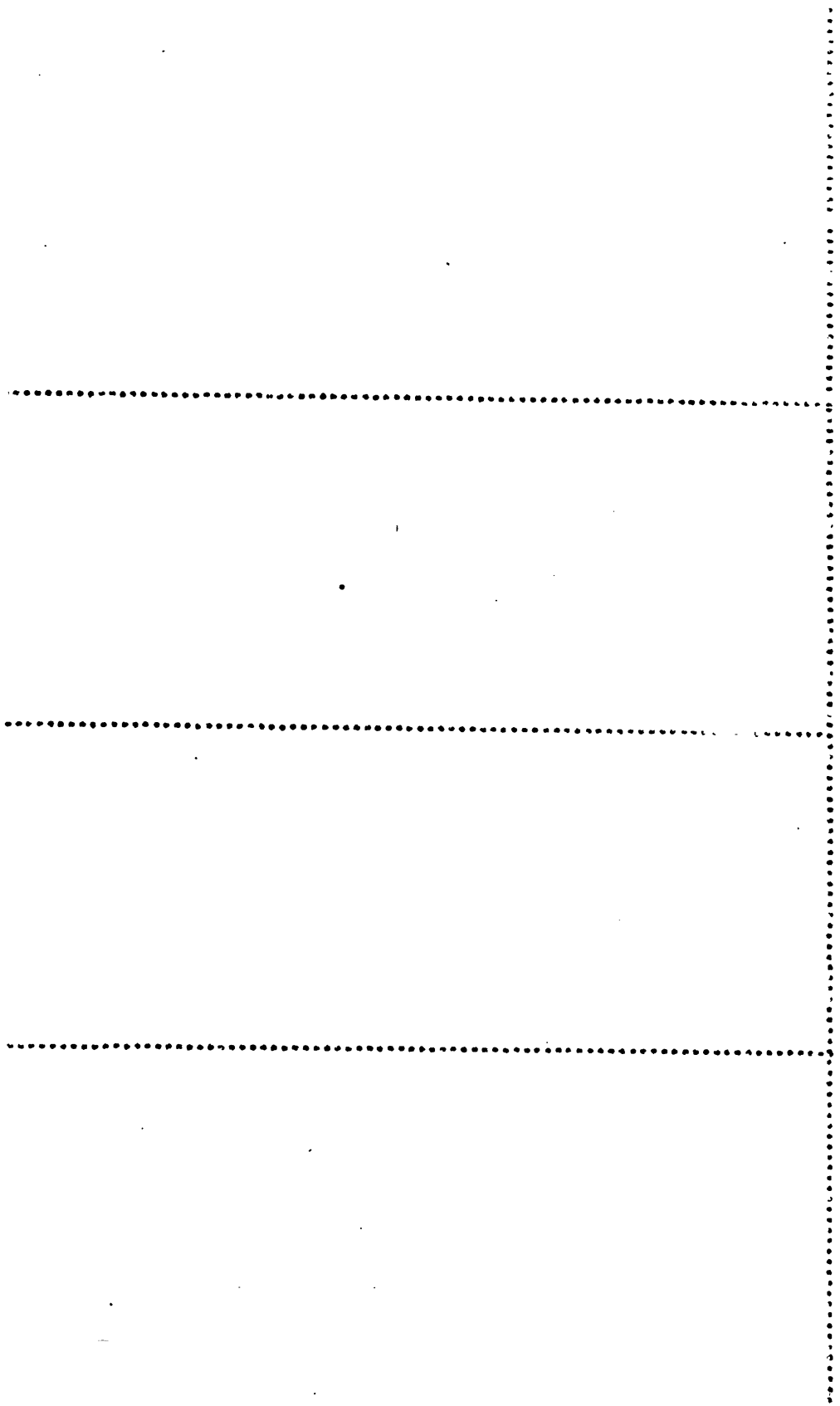
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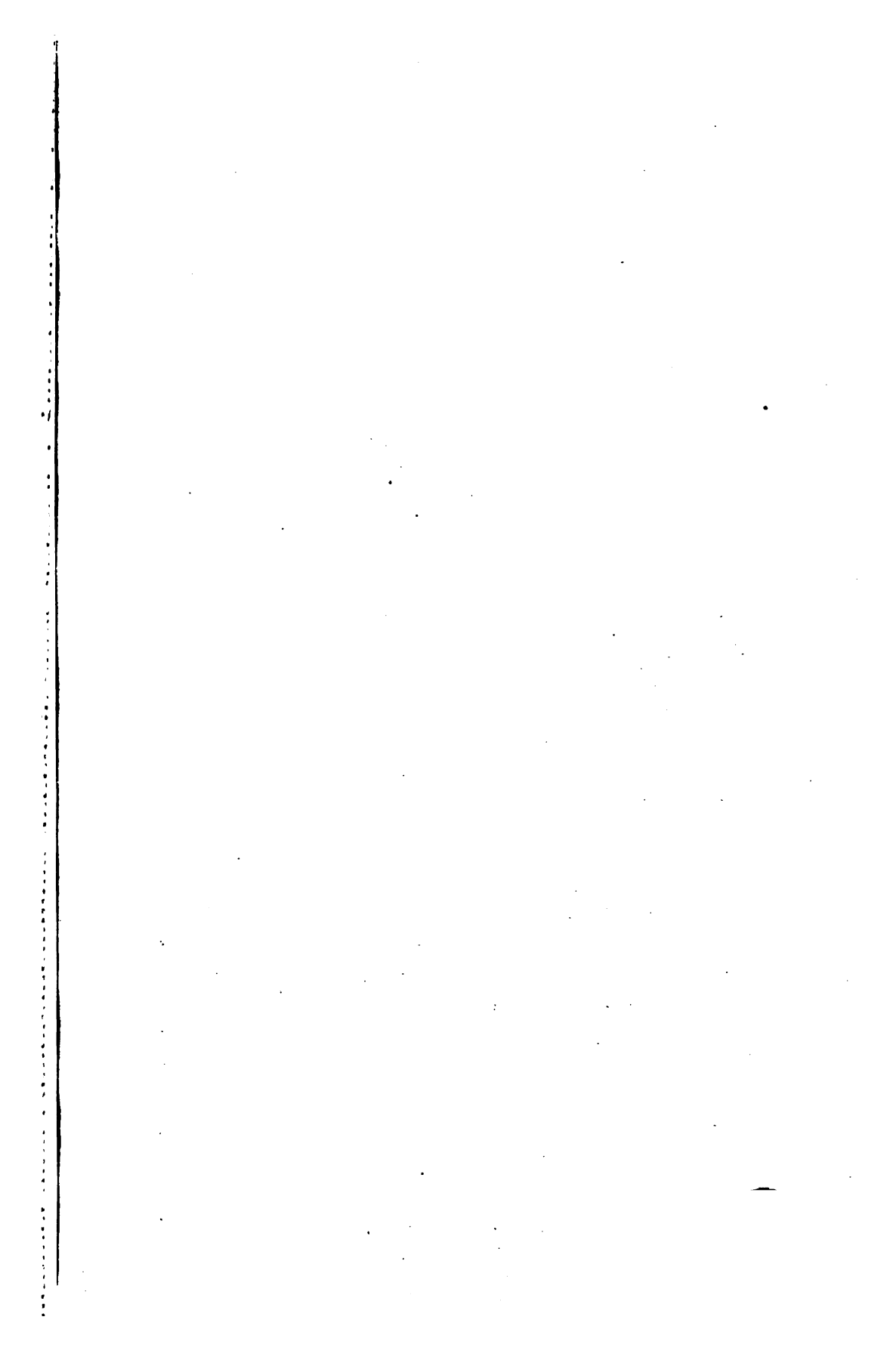
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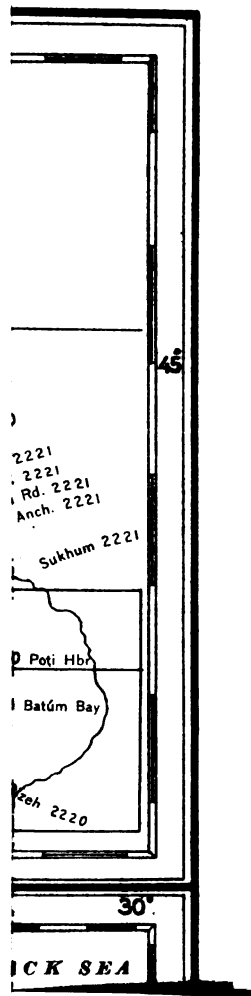
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## PREFACE.

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This publication contains sailing directions for the Dardanelles, Sea of Marmara, Bosphorus, Black Sea, and Sea of Azov. Commencing at the western entrance to the Dardanelles, the European and Asiatic shores are described in the order as given above.

This work is taken principally from the British Admiralty Black Sea Pilot, sixth edition, 1908, and supplements to 1917 for same. It contains the latest information from reliable sources and is corrected to N. M. 11, 1920.

The bearings and courses are true and are given in degrees, from 0° (north) to 360° (clockwise).

Bearings limiting sectors of lights are toward the light.

The directions of wind refer to the points from which they blow; of currents, the points toward which they set. These directions are true.

Variations, with the annual rate of change, may be obtained from H. O. Chart No. 2406, Variation of the Compass.

Distances are expressed in nautical miles, the mile being approximately 2,000 yards.

Soundings are referred to mean water level.

Heights are referred to mean water level.

The latest information regarding lights, their characteristics, sectors, fogsignals, and submarine bells should always be sought in the Light Lists, as all the details are not given in this volume, and changes are likely to occur.

**Summary of Notices to Mariners.**—While it is the intention of the Hydrographic Office to publish about the first of each year a summary of Notices to Mariners of the preceding year affecting the volume, it must be understood that these summaries are intended to include only important changes and corrections and that their publications may be discontinued at any time, especially when a new edition of the book is issued.

Masters of vessels should keep complete files of weekly Notices to Mariners and supply themselves with the latest List of Lights, and seek from local authorities, pilots, and harbor masters the latest information relative to any special regulations in force in the particular locality visited.

Mariners are requested to notify the United States Hydrographic Office, Washington, D. C., or one of its branch offices of errors they may discover in this publication, or of additional matter which they think should be inserted.

## CAUTION.

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Due to the abnormal conditions existing in the area embraced in this publication, accurate information regarding the latest changes in navigational aids and mine fields is not available. Therefore all mariners navigating in these waters are urged to use extreme caution. All ships entering the Black Sea should stop at Constantinople to correct their mine warnings to mariners and obtain the latest details regarding mine fields and routes.

# CONTENTS.

	Page.
Preface.....	III
Information relating to navigational aids and general navigation.....	1
Index.....	325
Index chart.....faces	III
List of Hydrographic Office agents.....	349
Glossary.....	VI
Appendix.....	321
CHAPTER I.	
General remarks—Communications—Climate—Winds and weather— Water level—Currents—Fogs—Pilots.....	15
CHAPTER II.	
The Dardanelles.....	21
CHAPTER III.	
Sea of Marmara.....	49
CHAPTER IV.	
The Bosphorus.....	103
CHAPTER V.	
Black Sea, western shore; Bosphorus to Odessa.....	125
CHAPTER VI.	
Black Sea, northern shore; Odessa to Gertch Strait.....	183
CHAPTER VII.	
Kertch Strait and Sea of Azov.....	233
CHAPTER VIII.	
Black Sea, Caucasian or eastern shore; Kertch Strait to Batum.....	273
CHAPTER IX.	
Black Sea, Anatolian or southern shore; Batum to the Bosphorus.....	299

# **GLOSSARY OF RUSSIAN WORDS THAT MAY BE OF USE TO THE NAVIGATOR.**

Russian.	English.	Russian.	English.
Admiralteistvo.....	Government dockyard.	Kuterma.....	A snowstorm.
Angliski konsul.....	English consul.	Led.....	Ice.
Bakan.....	A buoy.	Ledyanaya gora.....	An iceberg.
Baklan.....	A cormorant.	Lodka.....	A boat.
Banka.....	A shoal.	Lotzman.....	A pilot.
Bashnya.....	A tower, a seamark.	Lotzmanski tot.....	A pilot boat.
Bereg.....	The coast.	Lot.....	A sounding lead.
Blizhni.....	Near.	Luda.....	A rock or reef out of water.
Blokshiv.....	A hulk.	Luna.....	The moon.
Bochka.....	A buoy, a cask.	Lyes.....	A forest.
Bolshoi.....	Great.	Lyesnoi.....	Wooded.
Bot.....	A boat.	Lyeto.....	Summer, year.
Brosit yakor.....	To anchor.	Lyevi.....	Left, port.
Bukhta.....	A bay, a creek.	Lyevoy rulya.....	Port the helm.
Buksir.....	A tug.	Lyevoy na bort.....	Hard-a-port.
Burun.....	A breaker (surf).	Matros.....	A sailor.
Burva.....	A storm.	Mali.....	Little.
Bveli.....	White.	Marevo or Mirazh.....	Mirage.
Chaika.....	A gull.	Mayak.....	A lighthouse.
Chelovyak.....	A man.	Medvyed.....	A bear.
Cherni.....	Black.	Mel.....	A shoal.
Dalni.....	Distant.	Melkoe myesto.....	A shallow place.
Den.....	A day.	Melkovodje.....	Shallow water.
Derevo.....	A tree.	Mis.....	A point, a cape.
Derevnya.....	Village.	Mokri.....	Wet.
Dlinni.....	Long.	More.....	The sea.
Dno.....	Bottom.	Moroz.....	Frost.
Dolgota.....	Longitude.	Morskaya voda.....	Sea water.
Dom.....	A house.	Morskoj kot.....	A fur seal.
Doroga.....	A road.	Moryak.....	A seaman.
Dozhd.....	Rain.	Morz.....	A walrus.
Farvater.....	A channel.	Mrak.....	Darkness, gloom.
Flagshtok.....	Flagstaff.	Mutitsya.....	To become muddy.
Fut.....	Foot.	Myagki.....	Soft.
Gavan.....	A harbor.	Myed.....	Copper.
Glubina.....	Depth, soundings.	Na bereg or Na mel.....	Ashore.
Gluboki.....	Deep.	Naberezhnaya.....	A quay.
Golik.....	A broom (on spar buoy).	Nizki.....	Low.
Golova.....	The head (of a pier).	Nizhni.....	Lower.
Gora.....	A hill, a mountain.	Nizkaya voda.....	Low water.
Gorizont.....	The horizon.	Noch.....	Night.
Gorod.....	A town, a city.	Nos.....	A cape, a headland; bow of a vessel.
Gruda.....	A cairn, a pile.	Novi.....	New.
Gryaz.....	Mud.	Ogon.....	Fire, a light.
Guba.....	A bay, a gul.	Osen.....	Autumn.
Il.....	Slime, mud.	Ostrov.....	An island.
Izba.....	A hut.	Otdat yakor.....	To let go the anchor.
Kabeltov.....	A hawser, a cable's length.	Otliv.....	Ebb tide.
Kamen.....	A rock, a stone.	Otvival.....	Shove off.
Kanal.....	A channel, a canal.	Ozero.....	A lake.
Kanat.....	A chain cable.	Peleng.....	A bearing.
Karantin.....	Quarantine.	Pere myenni ogon.....	An alternating light.
Karta.....	A chart.	Peresheek.....	An isthmus.
Kater.....	A boat.	Peschani.....	Sandy.
Kayuta.....	A cabin.	Pesok.....	Sand.
Kholm.....	A hill.	Plavni.....	A mud flat overgrown with reeds.
Kholodni.....	Cold.	Plavuchi mayak.....	A light vessel.
Khorochi.....	Good.	Pochtamt.....	A post office.
Khudoi.....	Bad.	Podnyat yakor.....	To weigh anchor.
Kladbische.....	A cemetery.	Podvodni.....	Submerged.
Kladovaya.....	A storehouse.	Polden.....	Noon.
Kolyeno.....	A reach (of a channel, etc.).	Polnoch.....	Midnight.
Kompas.....	A compass.	Polnaya voda.....	High water.
Korabl.....	A ship.	Polovina.....	Half.
Kosa.....	A spit.	Polovoda.....	High-water spring tides.
Krasni.....	Red.	Poluostrov.....	A peninsula.
Krest.....	A cross.	Polyana.....	An ice field.
Krug.....	Round.	Port.....	A port, a harbor.
Krugoyar.....	Steep banks.	Postoyanni ogon.....	A fixed light.
Kryepki.....	Hard.	Postoyannis problems-kami ogon.....	A fixed and flashing light.
Kurgan.....	A tumulus.		

## GLOSSARY OF RUSSIAN WORDS THAT MAY BE OF USE TO THE NAVIGATOR—Continued.

Russian.	English.	Russian.	English.
Povorot.....	Turning, tacking, a bend.	Tishina.....	A calm.
Pozadi.....	Astern.	Tolstoi.....	Thick.
Pravi.....	Right, starboard.	Tombul.....	A buoy.
Pravo rulya.....	Starboard the helm.	Tonki.....	Thin.
Pravo na bort.....	Hard-a-starboard.	Tuman.....	A fog.
Pribol.....	Rollers.	Tyulen.....	A seal.
Pribilaya voda.....	High water.	Tserkov.....	A church.
Pribrezhenie.....	The beach.	Ubilaya voda.....	Low water.
Priliv.....	The flood tide.	Uglublenie.....	Draft of water.
Pristan.....	A landing stage, a pier.	Ugol.....	Coal.
Pristavaiye.....	Come alongside.	Utes.....	A cliff.
Problek.....	A flash.	Utro.....	Morning.
Problekovi ogen.....	A flashing light.	Uzel.....	A knot (a nautical mile).
Prokhod.....	A gullet, a passage.	Vecher.....	Evening.
Proliv.....	A strait.	Vertiyashchisya ogon.....	A revolving light.
Pryesnaya voda.....	Fresh water.	Vesna.....	Spring.
Pyatno.....	A shoal, a patch.	Vkhod.....	Entrance.
Reid.....	A roadstead.	Vnutrenni.....	Inner.
Rif.....	A reef.	Vnyeshni.....	Outer.
Riba.....	A fish.	Voda.....	Water.
Rul.....	A rudder, the helm.	Vodopoemni.....	Under water, submerged.
Rulevoi.....	A helmsman.	Vodopol.....	Overflow of a river.
Rumb.....	A compass point.	Vodorosl.....	Seaweed.
Ryeka.....	A river.	Volnya.....	A wave.
Sazhen.....	A fathom.	Vorota.....	Gates, a channel.
Seld.....	A herring.	Vostok.....	East.
Selo.....	A village with a church.	Vostochni.....	Eastern.
Shirota.....	Latitude.	Vpered.....	Ahead.
Shkval.....	A squall.	Vyeter.....	The wind.
Shlyupka.....	A boat.	Vyekha.....	A perch, a spar buoy.
Sini.....	Blue.	Yagel.....	Lichen, white moss.
Skala.....	A rock, a cliff.	Yakor.....	An anchor.
Sklonenie.....	Magnetic variation.	Yakornoe myesto.....	An anchorage.
Snyeg.....	Snow.	Yel.....	A fir tree.
Soleni.....	Salt.	Yug.....	South.
Solntse.....	The sun.	Yuzhni.....	Southern.
Sredi.....	In the middle.	Zakol.....	A weir.
Stan or Stanovishche.....	A station, a camp, a settlement.	Zalif.....	A bay, a gulf.
Starl.....	Old.	Zapad.....	West.
Storona.....	Side (of a channel, etc.).	Zapadni.....	Western.
Stvor.....	A leading line.	Zavod.....	A bay, a creek.
Stvornie znaki.....	Leading marks.	Zavod.....	A factory.
Sukhoi dok.....	A dry dock.	Zavorot.....	A turning.
Syeri.....	Gray.	Zeleni.....	Green.
Syever.....	North.	Zemlya.....	Land.
Syevernii.....	Northern.	Zhelti.....	Yellow.
Tamozhnyaya.....	Customhouse.	Zhelyezhaya deroga.....	Railway.
Techenie.....	Current.	Zhelyezo.....	Iron.
Temni.....	Dark (color).	Zima.....	Winter.
Tepli.....	Warm.	Znak.....	A beacon.
Tina.....	Ooze.	Zoloto.....	Gold.
		Zvyezda.....	A star.

## GLOSSARY OF TURKISH WORDS THAT MAY BE OF USE TO THE NAVIGATOR.

Turkish.	English.	Turkish.	English.
Agatch, Aghach, Aghaj.	Tree.	Kizil, Kizmi.	Red.
Agha.	A eunuch.	Kyupru.	A bridge.
Aghz.	Entrance.	Kuyu.	A well.
Ak.	White.	Koyun.	A bright, a cove.
Ata Ada, Adasi.	Island, islet, islands.	Kuchuk.	Small.
Bahrieh Feriki.	Vice admiral.	Kiurkz.	Pay.
Bakshish.	Gratuities.	Kulleh.	A tower.
Balchik.	Clay.	Kum.	Sand.
Bash.	Head, chief.	Kyupru.	A bridge.
Baterin.	A marsh.	Liman.	A port, a harbor, a bay.
Bazar.	Market.	Liman-reissi.	Port admiral.
Beyaz.	White.	Liva.	Country.
Boghaz or Boghazi.	A channel, strait, or estuary.	Maden.	A mine.
Burun, Burnu, or Bur-nar.	A cape, point, promontory, headland.	Mashreb.	West.
Buyuk.	Great.	Mejid.	A small mosque.
Capitan or captain.	Commander of a ship.	Mudir.	Governor of a city.
Chai.	A river.	Mouadess.	Saint, holy.
Chamur.	Mud.	Nehir.	A river, a stream.
Chiflik.	A farm.	Nishan.	A beacon.
I ash, Tash, or T'age.	A mountain.	Nizam.	A regulation.
Demir-yeri.	Anchorage.	Orman.	A forest, a wood.
Deniz or I enizli.	Sea.	Ova or Ovasi.	A plain.
Dere or I'eresi.	A valley.	Palanka.	A fort, a fortress.
Derin.	A deep.	Rakitsau.	Still water.
Dej irmeni.	A windmill.	Reis.	Chief, captain of ship.
Dil.	An isthmus, point, spit of sand.	Sanjak.	A flag.
Eski.	Old, ancient.	Sanjak-i-Humayun.	Imperial standard.
Fener.	A beacon.	Sanjak sheriff.	A religious flag.
Geul, Ghul, or Gol.	A lake.	Sarai.	A palace, a house.
Gharb, Gharbi.	West.	Selam.	Health, a salutation.
Gyumruk.	Customhouse.	Si.	Of, thus; deresi, valley of
Ich, Ichereh.	Inner.	Siglie.	A bank, a shoal.
Inshallah.	Please God!	Shamandirah.	A buoy.
Irmak.	A river.	Shark.	East.
Iskele or Tskalesi.	A landing place.	Shehr or Sheher.	A town, a city.
Jami.	A mosque.	Shemal.	North.
Jenub, Jenubi.	Southerly.	Su.	Water, stream.
Kaba-kum.	Gravel.	Tatia.	A battery.
Kale.	A castle.	Tiash, Tashrah.	Outer.
Kapu.	A gate, a pass.	Tashlik.	Stony.
Kara.	Black.	Tape or Tepesi.	A hill, a tumulus.
Kaya.	Bluff, cliff, rocky.	Tersane.	The Turkish Admiralty.
Ka:alik.	Rocky.	Terjuman.	An interpreter, a dragoon.
Keurliaz.	A gulf.	Togrouk.	Bar of a river.
Khan.	An inn, hotel.	Vilayet.	Country.
Kiot.	A village, hamlet.	Yar.	Bluff, cliff.
Kilaguz.	A pilot.	Yeni.	New.
Killsa.	A church.	Yer.	Land, country.
		Yol.	Channel, road.
		Yukari.	Up.



## INFORMATION RELATING TO NAVIGATIONAL AIDS AND GENERAL NAVIGATION.

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**Publications.**—The principal publications of the United States Hydrographic Office for the use of navigators are: Charts, Sailing Directions, American Practical Navigator, Altitude and Azimuth Tables, International Code of Signals, Light List, Notices to Mariners, Pilot Charts, and Hydrographic Bulletins. Of these the Notices to Mariners and the Hydrographic Bulletins are free to mariners and others interested in shipping. The Pilot Charts are free to contributors of professional information, but are sold to the general public at 10 cents a copy; other publications of the office are sold under the law at cost price, and can be purchased directly from the office or through its sales agencies, but are not sold by branch hydrographic offices.

**Charts** when issued are corrected to date.

The dates on which extensive corrections are made are noted on the chart on the right of the middle of the lower edge; those of the smaller corrections at the left lower corner.

The edition, and corresponding date, of the chart will be found in the right lower corner, outside the outer neat line.

**Planes of reference.**—The plane of reference for soundings on Hydrographic Office charts made from United States Government surveys and on Coast and Geodetic Survey charts of the Atlantic coast of the United States is mean low water; on the Pacific coast of the United States as far as the Strait of Juan de Fuca, it is the mean of the lower low waters; and from Puget Sound to Alaska, the plane employed on Hydrographic Office charts is low water ordinary springs.

On most of the British Admiralty charts the plane of reference is the low water of ordinary springs; on French charts, the low water of equinoctial springs.

In the case of many charts compiled from old or various sources the plane of reference may be in doubt. In such case, or whenever not stated on the chart, the assumption that the reference plane is low water ordinary springs gives a larger margin of safety than mean low water.

Whichever plane of reference may be used for a chart it must be remembered that there are times when the tide falls below it. Low

water is lower than mean low water about half the time, and when a new or full moon occurs at perigee the low water is lower than the average low water of springs. At the equinoxes the spring range is also increased on the coasts of Europe, but in some other parts of the world, and especially in the Tropics, such periodic low tides may coincide more frequently with the solstices.

Wind or high barometer may at times cause the water to fall below even a very low plane of reference.

Our coasts where there is much diurnal inequality in the tides, the amount of rise and fall can not be depended upon and additional caution is necessary.

**Mean sea level.**—The important fact should be remembered that the depths at half tide are practically the same for all tides whether neaps or springs. Half tide therefore corresponds with mean sea level. This makes a very exact plane of reference, easily found, to which it would be well to refer all high and low waters.

If called on to take special soundings for the chart at a place where there is no tidal bench mark, mean sea level should be found and the plane for reductions established at the proper distance below it, as ascertained by the Tide Tables, or by observations, or in some cases, if the time be short, by estimation, the data used being made a part of the record.

**Accuracy of chart.**—The value of a chart must manifestly depend upon the character and accuracy of the survey on which it is based, and the larger the scale of the chart the more important do these become.

To judge a survey, its source and date, which are generally given in the title, are good guides. Besides the changes that may have taken place since the date of the survey in waters where sand or mud prevails, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail; until a chart founded on such a survey is tested it should be used with caution. It may, indeed, be said that, except in well frequented harbors and their approaches, no surveys yet made have been so thorough as to make it certain that all dangers have been found. The number of the soundings is another method of estimating the completeness of the survey, remembering, however, that the chart is not expected to show all soundings that were obtained. When the soundings are sparse or unevenly distributed it may be taken for granted that the survey was not in great detail.

Large or irregular blank spaces among soundings mean that no soundings were obtained in these spots. When the surrounding soundings are deep it may fairly be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks

should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch or pinnacle rock.

**Fathom curves a caution.**—Except in charts of harbors that have been surveyed in detail, the 5-fathom curve on most charts may be considered as a danger line, or caution against unnecessarily approaching the shore or bank within that curve on account of the possible existence of undiscovered inequalities of the bottom, which only an elaborate detailed survey could reveal. In general surveys of coasts, or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for so detailed a survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The 10-fathom curves on rocky shores is another warning, especially for ships of heavy draft.

A useful danger curve will be obtained by tracing out with a colored pencil, or ink, the line of depth next greater than the draft of the ship using the chart. For vessels drawing less than 18 feet the edge of the sanding serves as a well-marked danger line.

Charts on which no fathom curves are marked must especially be regarded with caution, as indicating that soundings were too scanty and the bottom too uneven to enable the curves to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed around, as it is doubtful how closely the spot may have been examined and whether the least depth has been found.

**The chart on largest scale** should always be used on account of its greater detail and the greater accuracy with which positions may be plotted on it.

**Caution in using small-scale charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in plotting a position means only yards on a large scale chart, whereas on one of small scale the same amount of displacement means a large fraction of a mile.

**Mercator chart.**—Observed bearings are not identical with those measured on the Mercator chart (excepting only the bearings north and south, and east and west on the equator) because the line of sight, except as affected by refraction, is a straight line and lies in the plane of the great circle, while the straight line on the chart (except the meridian line) represents, not the arc of a great circle, but the loxodromic curve, or rhumb line, which on the globe is a spiral ap-

proaching but never in theory reaching the pole, or, if the direction be east and west, a circle of latitude.

The difference is not appreciable with near objects, and in ordinary navigation may be neglected. But in high latitudes, when the objects are very distant and especially when lying near east or west, the bearings must be corrected for the convergence of the meridians in order to be accurately placed on the Mercator chart, which represents the meridians as parallel.

**Polyconic chart.**—On the polyconic chart, since a straight line represents (within the limits of 15 or 20 degrees of longitude) the arc of a great circle or the shortest distance between two points, bearings of the chart are identical with observed bearings.

The Mercator projection is unsuited to surveying, for which purpose the polyconic projection is used by the Hydrographic Office and the Coast and Geodetic Survey.

**Notes on charts** should always be read with care, as they may give important information that can not be graphically represented.

Current arrows on charts show only the most usual or the mean direction of a current; it must not be assumed that the direction of a current will not vary from that indicated by the arrow. The velocities, also, of currents vary with circumstances, and those given on the charts are merely the mean of those determined, possibly from very few observations.

**Compass roses on charts.**—The gradual change in the variation must not be forgotten in laying down on the chart courses and bearings from the magnetic compass roses, which become in time slightly in error, and in some cases, such as with small scales or when the lines are long, the displacement of position from neglect of this change may be of importance. The date of the variation and the annual change, as given on the compass rose, facilitate corrections when the change has been considerable. It is better to reduce all magnetic bearings and courses to true and then use the true compass rose.

The change in the variation for a change of position, is in some parts of the world so rapid as to need careful consideration, requiring a frequent change of the course. For instance, in approaching Halifax from Newfoundland the variation changes  $10^{\circ}$  in less than 500 miles.

**Local magnetic disturbance of the compass on board ship.**—The term "local magnetic disturbance" has reference only to the effects on the compass of natural magnetic masses external to the ship. Observation shows that such disturbance of the compass in a ship afloat is experienced in many places on the globe.

Magnetic laws do not permit of the supposition that the visible land causes such disturbance, because the effect of a magnetic force diminishes so rapidly with distance that it would require a local

center of magnetic force of an amount absolutely unknown to affect a compass  $\frac{1}{2}$  mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow and the force strong, the compass may be temporarily deflected when passing over such a spot; but the area of disturbance will be small unless there are many centers near together.

**Aids—Buoys.**—Too much reliance should not be placed on buoys always maintaining their exact positions. They should therefore be regarded as warnings, and not as infallible navigational marks, especially when in exposed places and in the wintertime; and a ship's position should always, when possible, be checked by bearings or angles of fixed objects on shore.

The light shown by a light buoy can not be implicitly relied on; it may be altogether extinguished, or, if periodic, the apparatus may get out of order.

Whistle and bell buoys are sounded only by the action of the sea; therefore, in calm weather, they are less effective or may not sound.

**Lights.**—All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of 15 feet for the observer's eye. The effect of a greater or less height of eye can be ascertained by means of the table of distances of possible visibility due to height, published in the Light Lists.

The loom of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, and this must not be confounded with the true range. Refraction, too, may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light, the fact may be forgotten that aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be obtained from the standard compass when you lay down from aloft.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the ship is on the circle of visibility corresponding with the usual height of the eye, or unexpectedly nearer the light.

When a light is sighted it should be identified at once by checking its characteristics. This is particularly necessary when approaching well-lighted coasts, where lights with similar characteristics are often found close together.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by its candlepower or order, as given in the Light Lists, and in some cases by noting how much

its visibility in clear whether falls short of the range corresponding to its height. Thus, a light standing 200 feet above the sea and recorded as visible only 10 miles in clear weather is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

**Sailing Directions or Pilots** are books treating of certain sections or divisions of the navigable waters of the globe. They contain descriptions of coast lines, dangers and harbors, information of winds, currents, and tides, and directions for approaching and entering harbors, and much other general information of interest to mariners.

The Sailing Directions are corrected, as far as practicable, to the date of issue from the office; they can not, from their nature and the infrequency of their revision, be so fully corrected as charts and Light Lists, and for that reason, when they differ the one of the most recent issue should be accepted as correct.

**Light Lists**, published about once a year, are corrected before issue, and changes affecting them are published in the weekly Notices to Mariners.

The navigator should make notations of corrections in the tabular form in the Light Lists and paste in at the appropriate places the slips from the Notices to Mariners.

**Notices to Mariners**, containing newly acquired information pertaining to various parts of the world, are published weekly and mailed to all United States ships in commission, Branch Hydrographic offices and agencies, and United States consulates. Copies are furnished free by the main office or by any of the branch offices on application.

With each Notice to naval vessels is sent also a separate sheet, giving the items relative to lights contained in the latest Notice, intended especially for use in correcting the Light Lists.

**Pilot Charts** of the North Atlantic, Central American Waters, and North Pacific and Indian Oceans are published each month, and of the South Atlantic and South Pacific Oceans each quarter. These charts give the average conditions of wind and weather, barometer, percentage of fog and gales, routes for steam and sailing vessels, ice, derelicts, ocean currents, storm tracks, and other useful information. They are furnished free only in exchange for marine data or observations.

**Hydrographic Bulletins**, published weekly, are supplemental to the Pilot Charts, and contain the latest reports of obstructions and dangers along the coast and principal ocean routes and other information for mariners. They are to be had free upon application.

The bulletins are supplemented by the Daily Memorandum published daily, Sundays and holidays excepted, in order that the in-

formation relating to dangers and aids to navigation received may be disseminated as quickly as possible.

**Tides.**—A knowledge of the times of high and low water and of the amount of vertical rise and fall of the tide is of great importance in the case of vessels entering or leaving port, especially when the low water is less than or near their draft. Such knowledge is also useful at times to vessels running close along a coast, in enabling them to anticipate the effect of the tidal currents in setting them on or offshore. This is especially important in fog or thick weather.

**Tidal currents.**—In navigating along coasts where the tidal range is considerable, special caution is necessary. It should be remembered that there are generally indrafts and corresponding outdrafts abreast of all large bays and bights, although the general run of the current may be nearly parallel with the shore outside the entrances.

The turn of the tidal current offshore is seldom coincident with the times of high and low water along the shore. In some channels the tidal current may overrun the turn of the vertical movement of the tide by three hours, the effect of which is that at high and low water by the shore the current is running at its greatest velocity.

The effect of the tidal wave in causing currents may be illustrated by two simple cases:

(1) Where there is a small tidal basin connected with the sea by a large opening.

(2) Where there is a large tidal basin connected with the sea by a small opening.

In the first case the velocity of the current in the opening will have its maximum value when the height of the tide within is changing most rapidly, i. e., at a time about midway between high and low water. The water in the basin keeps at approximately the same level as the water outside. The flood current corresponds with the rising and the ebb with the falling of the tide.

In the second case the velocity of the current in the opening will have its maximum value when it is high water or low water without, for then there is the greatest head of water for producing motion. The flood current begins about three hours after low water, and the ebb current about three hours after high water, slack water thus occurring about midway between the tides.

Along most shores not much affected by bays, tidal rivers, etc., the current usually turns soon after high water and low water.

The swiftest current in straight portions of tidal rivers is usually in the middle of the current, but in curved portions the most rapid current is toward the outer edge of the curve, and here the deepest water will generally be found. The pilot rule for best water is to follow the ebb tide reaches.

Countercurrents and eddies may occur near the shores of straits, especially in bights and near points. A knowledge of them is useful in order that they may be taken advantage of or avoided.

A swift current often occurs in a narrow passage connecting two large bodies of water, owing to their considerable difference of level at the same instant. The several passages between Vineyard Sound and Buzzards Bay are cases in point.

Tide rips are made by a rapid current setting over an irregular bottom, as at the edges of banks where the change of depth is considerable.

**The Tide Tables**, which are published annually by the United States Coast and Geodetic Survey, give the predicted times and heights of the high and the low waters for every day in the year at 81 of the principal ports of the world, and, through the medium of these by means of tidal differences and ratios, at a very large number of subordinate ports. The tables for the Atlantic and the Pacific coast ports of the United States are also published separately.

It should be remembered that these tables aim to give the times of high and low water, and not the times of turning of the current or of slack water, which may be quite different.

The distinction between "rise" and "range" of the tide should be understood. The former expression refers to the height attained above the datum plane for soundings, differing with the different planes of reference; the latter, to the difference of level between successive high and low waters.

Full explanations and directions for their use are given in the Tide Tables.

**Fog signals.**—Sound is conveyed in a very capricious way through the atmosphere. Apart from the influence of the wind large areas of silence have been found in different directions and at different distances from the origin of sound, even in clear weather; therefore, too much confidence should not be felt as to hearing a fog signal. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly toward the land, and may not be observed by the lighthouse keepers until upon them; a ship may have been for many hours in it, and approaching the land in confidence, depending on the signal, which is not sounded. When sound travels against the wind, it may be thrown upward; a man aloft might hear it though inaudible on deck.

The submarine bell system of fog signals is much more reliable than systems transmitting sound through the air, as sound traveling in water is not subject to the same disturbing influences; the fallibility of the lighthouse keeper is, however, about the same in all systems, so that caution should be observed even by vessels equipped with submarine bell receiving apparatus.



**Submarine bells** have an effective range of audibility greater than signals sounded in air, and a vessel equipped with receiving apparatus may determine the approximate bearing of the signal. These signals may be heard also on vessels not equipped with receiving apparatus by observers below the water line, but the bearing of the signal can not then be readily determined.

Vessels equipped with radio apparatus and submarine bell receivers may fix their distance from a light vessel having radio and submarine bell, utilizing the difference in velocity of sound waves of the radio and the bell. Sound travels 4,794 feet per second at 66° F. in water, and the travel of radio sound waves for practicable distances may be taken as instantaneous.

All vessels should observe the utmost caution in closing the land in fogs. The lead is very often the safest guide and should be faithfully used.

**Radio compass stations.**—Most valuable aids to navigation in a fog are the radio compass stations, which will fix a ship's position by two or more bearings from a single radio station, or by simultaneous bearings from two or more stations.

In localities where only one radio station is available, mariners may use the single bearing, like Sumner's line of position, or a single bearing of any object whose position is known.

All reports from mariners indicate great accuracy in the bearings given by the radio station, and they should be used whenever available.

### PILOTING—FIXING POSITION.

**Piloting**, in the sense given the word by modern and popular usage, is the art of conducting a vessel in channels and harbors and along coasts, where landmarks and aids to navigation are available for fixing the position, and where the depth of water and dangers to navigation are such as to require a constant watch to be kept upon the vessel's course and frequent changes to be made therein.

Piloting is the most important part of navigation and the part requiring the most experience and nicest judgment. An error in position on the high seas may be rectified by later observations, but an error in position while piloting often results in disaster. Therefore the navigator should make every effort to be proficient in this important branch, bearing in mind that a modern vessel is usually safe on the high seas and in danger when approaching the land and making the harbor.

The navigator, in making his plan for entering a strange port, should give very careful previous study to the chart and sailing directions, and should select what appear to be the most suitable marks

for use, also providing himself with substitutes to use in case those selected as most suitable should prove unreliable in not being recognized with absolute certainty. Channel buoys seen from a distance are difficult to identify, because their color is sometimes not easily distinguished and they may appear equally distant from the observer even though they be at widely varying distances. Ranges should be noted, if possible, and the lines drawn, both for leading through the best water in channels, and also for guarding against particular dangers; for the latter purpose safety bearings should in all cases be laid down where no suitable ranges appear to offer. The courses to be steered in entering should also be laid down and distances marked thereon. If intending to use the sextant and danger angle in passing dangers, and especially in passing between dangers, the danger circles should be plotted and regular courses planned rather than to run haphazard by the indications of the angle alone, with the possible trouble from bad steering at critical points.

The ship's position should not be allowed to be in doubt at any time, even in entering ports considered safe and easy of access, and should be constantly checked, continuing to use for this purpose those marks concerning which there can be no doubt until others are unmistakably identified.

The ship should ordinarily steer exact courses and follow an exact line, as planned from the chart, changing course at precise points, and, where the distances are considerable, her position on the line should be checked at frequent intervals. This is desirable even where it may seem unnecessary for safety, because if running by the eye alone and the ship's exact position be immediately required, as in a sudden fog or squall, fixing at that particular moment may be attended with difficulty.

The habit of running exact courses with precise changes of course will be found most useful when it is desired to enter port or pass through inclosed waters during fog by means of the buoys; here safety demands that the buoys be made successively, to do which requires, if the fog be dense, very accurate courses and careful attention to the times, the speed of the ship, and the set of the current; failure to make a buoy as expected leaves, as a rule, no safe alternative but to anchor at once, with perhaps a consequent serious loss of time.

In passing between dangers where there are no suitable leading marks, as, for instance, between two islands or an island and the main shore when the conformations of the shore line are very similar, with dangers extending from both, a mid-channel course may be steered by the eye alone with great accuracy, as the eye is able to estimate very closely the direction midway between.

In piloting among coral reefs or banks, a time should be chosen when the sun will be astern, conning the vessel from aloft or from an elevated position forward. The line of demarcation between the deep water and the edges of the shoals is indicated with surprising clearness. This method is of frequent application in the numerous passages of the Florida Keys.

Changes of course should in general be made by exact amounts, naming the new course or the amount of the change desired, rather than by ordering the rudder to be put over and then steadying when on the desired heading, with the possibility of the attention being diverted and so of forgetting in the meantime, as may happen, that the ship is still swinging. The steersman, knowing just what is desired and the amount of the change to be made, is thus enabled to act more intelligently and to avoid bad steering, which in narrow channels is a very positive source of danger.

**Coast piloting** involves the same principles and requires that the ship's position be continuously determined or checked as the landmarks are passed. On well-surveyed coasts there is a great advantage in keeping near the land, thus holding on to the marks and the soundings, and thereby knowing at all times the position rather than keeping offshore and losing the marks, with the necessity of again making the land from a vague position, and perhaps the added inconvenience of fog or bad weather, involving a serious loss of time and fuel.

The route should be planned for normal conditions of weather, with suitable variations where necessary in case of fog or bad weather or making points at night, the courses and distances, in case of regular runs over the same route, being entered in a notebook for ready reference, as well as laid down on the chart. The danger circles for either the horizontal or the vertical danger angles should be plotted, wherever the method can be usefully employed, and the angles marked thereon; many a mile may thus be saved in rounding dangerous points with no sacrifice in safety. Ranges should also be marked in, where useful for position or for safety, and also to use in checking the deviation of the compass by comparing in crossing the compass bearing of the range with its magnetic bearing as given by the chart.

A continuous record of the progress of the ship should be kept by the officer of the watch, the time and patent log reading of all changes of course and of all bearings, especially the two and four point bearings, with distance of object when abeam, being noted in a book kept in the pilot house for this special purpose. The ship's reckoning is thus continuously cared for as a matter of routine and without the presence or particular order of the captain or navigating officer. The value of thus keeping the reckoning always fresh and exact will be

especially appreciated in cases of sudden fog or when making points at night.

Where the coastwise trip must be made against a strong offshore or head wind, it may be desirable, with trustworthy charts, to skirt the shore as closely as possible in order to avoid the heavier seas and adverse current that prevail farther out. In some cases, with small ships, a passage can be made only in this way. The important saving of coal and of time, which is even more precious, thus effected by skillful coast piloting makes this subject one of prime importance to the navigator. However, many vessels have gotten into serious trouble by attempting to save time and cut down distances by rounding too closely dangers and aids, and navigators should always bear in mind that the safety of the vessels is the first consideration.

**Fixing position.**—A navigator in sight of objects whose position are shown on the chart, and which he can recognize, may locate his vessel by any one of the following methods:

1. Sextant angles between three known objects.
2. The bearing of a known object and angle between two known objects.
3. Cross bearings of two known objects.
4. Two bearings, of a known object, separated by an interval of time, with the run during that interval.
5. The bearing and distance of a known object.

Besides the foregoing there are two methods by which, without obtaining the precise position, the navigator may assure himself that he is clear of any particular danger.

1. The danger angle.
2. The danger bearing.

These various methods are fully explained in most textbooks on navigation and in Bowditch's American Practical Navigator, a copy of which should be in the navigator's outfit.

The first method of fixing the position, by the "three-point problem," is the most accurate of all methods, but requires expertness in the use of the sextant and protractor. However, the choice of the method should be governed by circumstances, depending upon which is best adapted to prevailing conditions.

**Soundings** are of very great advantage when approaching land or shoal banks in determining the position, and the convenience in the use of modern sounding machines renders any neglect to take soundings inexcusable.

Soundings taken at random are of little value in fixing or checking position and may at times be misleading. In thick weather, when near or closing the land, soundings should be taken continuously and at regular intervals, and, with the character of the bottom, systematically recorded. By laying the soundings on tracing paper,

according to the scale of the chart, along a line representing the track of the ship, and then moving the paper over the chart, keeping the line representing the track parallel with the course until the observed soundings agree with those of the chart, the ship's position will in general be quite well determined.

**At sea** the only methods of determining the position of the vessel are by "dead reckoning" and by observations of heavenly bodies, though observations may be made use of by various methods. (See American Practical Navigator and textbooks on navigation.)

The one which should be best understood and put to the most constant use is that employing position or Summer lines. These lines give the most comprehensive information to the navigator with the least expenditure of labor and time. The knowledge gained is that the vessel must be somewhere on the line, provided the data used is accurate and the chronometer correct. As the information given by one line of position is not sufficient to determine the definite location of the vessel, it is necessary to cross this line by another similarly obtained, and the vessel being somewhere on both must be at their intersection. However, a single line, at times, will furnish the mariner with invaluable information; for instance, if it is directed toward the coast, it marks the bearing of a definite point on the shore, or if parallel to the coast it clearly indicates the distance off, and so will often be found useful as a course. A sounding taken at the same time with the observation will in certain conditions prove of great value in giving an approximate position on the line.

The easiest and quickest way to establish a line of position is by employing the method of Marcq St. Hilaire, as modified by the use of tables of altitude.

A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon is well defined. The position lines thus obtained will, if the bearings of the stars differ three points or more, give an excellent result. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun with sufficient interval to admit of a considerable change of bearing; in these cases one of the lines must be moved for the run of the ship.

**Use of oil for modifying the effect of breaking waves.**—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skillfully applied, may prevent much damage both to ships, especially of the smaller classes, and to boats by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:

1. On free waves, i. e., waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.
3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when no other oil is obtainable, or it may be mixed with other oils; all animal and vegetable oils, such as waste oil from the engines, have great effect.
4. In cold water, the oil, being thickened by the low temperature and not being able to spread freely, will have its effect much reduced. A rapid spreading oil should be used.
5. A small quantity of oil suffices, if applied in such a manner as to spread to windward.
6. It is useful in a ship or boat either when running, or lying-to, or in wearing.
7. When lowering and hoisting boats in a heavy sea the use of oil has been found greatly to facilitate the operation.
8. For a ship at sea the best method of application appears to be to hang over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, the bags being pricked with a sail needle to permit leakage. The waste pipes forward are also very useful for this purpose.
9. Crossing a bar with a flood current, to pour oil overboard and allow it to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan.
- On a bar, with the ebb current running, it would seem to be useless to try oil for the purpose of entering.
10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside, bearing in mind that her natural tendency is always to forge ahead. If she is aground the effect of oil will depend upon attending circumstances.
11. For a boat riding in bad weather to a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil can be diffused well ahead of the boat, and the bag readily hauled on board for refilling, if necessary.

## CHAPTER I.

### THE DARDANELLES, SEA OF MARMARA, BOSPORUS, BLACK SEA, AND SEA OF AZOV—GENERAL REMARKS—CLIMATE—WINDS AND WEATHER—CURRENTS—WATER LEVEL—FOGS—PILOTS— COMMUNICATION.

**General remarks.**—The European side of the Dardanelles is bordered by hills and mountains and the shore is steep-to, while the Asiatic side, with few exceptions, is bordered by flat plains and the shore is fringed for almost the entire length of it by a shallow bank extending from it.

The Sea of Marmara, which is about 160 miles long east and west and 50 miles wide at the widest part, is bordered for almost the entire extent of it by high and mountainous land. The coast line is quite irregular, consisting of many indentations and projections. It contains four groups of islands, the largest island of any of the groups being Marmara Island, from which the sea derives its name.

The Bosphorus, which connects the Black Sea with the Sea of Marmara, is about 17 miles long and, like the Dardanelles, it resembles a river with abrupt and angular windings, the projecting points of which check the velocity of the current through it.

The Black Sea, containing an area of about 170,000 square miles, separates European Russia from Asia Minor. The shores, while varied in aspect, are in most parts high. From Cape Rumili to Cape Kaliakra the shore is of moderate height, backed by mountains mostly of a very picturesque appearance. The coast thence, including the Delta of the Danube, is low, slightly increasing in height toward the Crimean Peninsula. This peninsula, as is also the eastern and southern coasts, is bordered by high and lofty mountains.

The Sea of Azov contains an area of about 14,000 square miles. The northern coast ranges from 90 to 130 feet in height and has a reddish appearance. On its surface, which is flat, a few hills may be seen. Extensive spits of sand, bordered by banks, are formed around all the promontories.

**Climate.**—Although the climate of the Dardanelles may be considered as generally good; during summer and autumn, in the neighborhood of swamps, the miasmatic exhalations rising from them pro-

duce fevers. Chanak is said to be free from climatic disease, and the climate of Gallipoli very healthy; whereas Lampsaki, on the opposite side of the strait, is stated to be the reverse, which is probably due to the swampy nature of the land in the vicinity.

The fever and ague, caused by malaria or marsh poison, is to be apprehended over most parts of Asia Minor, from the end of April to the end of September; or in exceptionally healthy years, from the end of May to the middle of September; and although low ground is to be avoided during that season, moderately elevated land is not necessarily exempt from these malarious exhalations, which may be brought by the wind blowing over pestiferous marshes.

The climate of Constantinople depends greatly on the direction of the winds, as those from the Black Sea are generally cold, and charged with moisture, while the winds from the Sea of Marmara render the atmosphere soft and genial. The weather is very variable, and during the winter months heavy falls of snow are often experienced.

In the Black Sea the severe winters are succeeded by pleasant summers, especially on the south coast of the Crimea, where the warm, clear atmosphere is favorable to the cultivation of the vine. At Varna the mean winter temperature of the months of December, January, and February is about  $34^{\circ}$ ; the summer mean temperature of June, July, and August  $75^{\circ}$ , and the annual means  $55^{\circ}$ .

At Odessa in the same months of winter and summer the means are  $25.2^{\circ}$  and  $70.7^{\circ}$ , respectively, with a mean annual temperature of  $49.3^{\circ}$ , and in the Caucasus the climate is at all seasons very pleasant, the means of winter, summer, and annual temperature at Tiflis in the same months being  $35.6^{\circ}$ ,  $73.9^{\circ}$ , and  $55.2^{\circ}$ . About Batum and Poti the coast has the reputation of being exceedingly unhealthy, and in some parts of Anatolia the previous remarks regarding fevers in summer and autumn apply.

**Winds.**—The north and northeast, or Etesian winds, named Meltem by the Turks, prevail on an average nine months of the year, whereas the irregular westerly winds last scarcely three months, during which period it frequently happens that they are not felt in the Archipelago, where it is generally a calm. The winds are most variable at the equinoxes, and generally any change from north to south will take place at new or full moon.

**Currents.**—There is a general flow of the Black Sea water through the Bosphorus, Sea of Marmara, and Dardanelles to the Mediterranean, probably caused by the combination of three elements—firstly, the prevalence of northeast winds in the Black Sea; secondly, the excess of water received from the large rivers over the amount lost by evaporation at some seasons; and, thirdly, the difference of specific gravities in the two seas.



Of these, the wind has by far the greatest influence, for it has been observed that the current in the Bosphorus is generally stronger in the afternoon than in the forenoon, and as the mornings are usually calm, and the northeast wind gains strength during the day, the increase in the strength of the currents seems to be due to the wind.

There is, in general, a countercurrent setting under the surface stream in an opposite direction, namely, from the Mediterranean to the Black Sea; the undercurrent seems to be dependent on the surface current, for, when the latter is slack, the undercurrent is slack also.

The average velocity of the surface current in the Bosphorus is estimated at  $2\frac{1}{2}$  knots, and in the Dardanelles  $1\frac{1}{2}$  knots.

**Water level.**—The depths shown on the charts of the Sea of Marmara, Black Sea, and Sea of Azov are the depths at the mean level of the water. Although not subject to tidal influence, the level of the water is subject to variations caused by barometric height and by wind.

In the Gulf of Perekop strong winds offshore frequently lower the level of the water as much as 2 or 3 feet.

The level of the water in the Dardanelles rises sometimes as much as 2 feet above the normal, and strong southerly winds will raise that of the Bosphorus by a similar amount.

At Kilios, near the Black Sea entrance to the Bosphorus, the level of the water has been reported to vary from 3 to 5 feet.

A continuance of strong northeasterly winds will reduce the depths in the delta of the Don as much as 5 feet, and increase the depths in Kertch Strait about half that amount. When these winds subside, a reaction takes place, and the current runs back into the Sea of Azov until the ordinary level is established. By the second day, the depth in the strait will have decreased 1 foot or more.

A continuance of southwest winds will cause the current to run into the Sea of Azov, reducing the depths in Kertch Strait by 1 foot or more.

**Fogs.**—In the Bosphorus during the months of October to February inclusive, and in the beginning of March, fogs, with calms and light winds from northeast are experienced, but they clear off at sunrise. Fogs sometimes come on with light southwest winds during the period mentioned, but clear away in the afternoon.

From the middle of April to the middle of May, the fogs prevalent in the Black Sea generally enter the Bosphorus during the night and morning, filling the channel and rendering it unnavigable; they more particularly cling to the coast of Europe, and seldom clear off till the sun is near the meridian. If they should hang in spots, especially toward the Sea of Marmara, southwest winds may be expected. These fogs are said to be unhealthy.

If the weather be fine in the Bosphorus, and the Black Sea entrance at the same time be hidden by a fog bank, a shift of wind to northeast may be expected. In winter, sudden shifts of wind are, as before remarked, frequent and dangerous, especially if, as it often happens, they come on at the same time as a thick fog; a vessel then caught aback in the middle of the channel would be in a very awkward position. A good lookout should therefore always be kept when near the entrance of the Black Sea, and no sailing vessel should delay anchoring, or making fast to the shore, when these warning signs are observed.

**Pilots** for Constantinople, the Black Sea, Sea of Marmara, Enos, or the Archipelago may be obtained at Chanak, and they are sometimes engaged at Constantinople by masters of vessels proceeding to the Black Sea and Sea of Azov. This practice is said to be fraught with considerable risk, as there are few, if any, competent pilots for the navigation of those seas to be obtained at Constantinople, the men who call themselves pilots being mostly stevedores and interpreters.

Pilots for the Danube may also be obtained at Chanak. A bargain must also be concluded with them; there is no fixed price.

There is a large staff of pilots at Sulina, 16 of whom are exclusively set apart for piloting ships into the Sulina Mouth, and there are 47 pilots for the upper portion of the river. The pilots meet ships about  $1\frac{1}{2}$  miles outside the mouth.

Pilots will probably meet vessels both at the Kertch and Sea of Azov entrances to Yenikale Channel.

There are pilot stations at Odessa, Ochakov, Nikolæv, Karkinit Bay, Kertch (for Sea of Azov pilots), Mariupol, Rostov (for Don River pilots), Poti, and Batum.

**Communication—Railways.**—There is no railway communication along the shores of the Dardanelles, or on the north or south shores of the Sea of Marmara, except where the line from Constantinople runs for a short distance on the north coast as far as Kuchuk Chekmejeh, before turning inland; and on the south coast, where a short line connects Mudania with Brusa. On the east coast of the Sea of Marmara the railway from Haidar Pasha, on the Skutari side of the Bosphorus, skirts the shore as far as Paulo Liman, where it cuts inland across two points, between which is Tuzla Bay; then runs close along the north shore of the Gulf of Ismid, to the town of Ismid, from thence to Ada Bazar, where it turns to the southward and at Afion Kara Hissar, joins the main line between Smyrna, Konia, and Eregli. There is a branch from this railway to Angora.

In normal times Constantinople was in railway communication with the whole railway system of Europe, via Adrianople, Philippopolis, Bellova (at the foot of the Balkans), Sofia, and Belgrade.

The Yamboli-Burghaz Railway connects the port of Burghaz, on the western shore of the Black Sea, with Yamboli, a distance of 67½ miles; from thence there is a line to Tirnova, on the Constantinople & Philippopolis Railway.

The Varna & Rustchuk Railway, 140 miles in length, which belongs to an English company, connects Varna with Rustchuk, situated on the Danube at the foot of the Balkans; and opposite Rustchuk, on the other side of the Danube, a line from Giurgevo runs to Bukarest, which is connected with Wallachian and Transylvanian lines.

The Danube & Black Sea Railway, from Constantza to Cherna-voda, 40 miles, cuts off a portion of the lower Danube, and was constructed principally for the corn trade.

There is direct railway communication between Odessa and St. Petersburg by way of Moscow, 1,441 miles. The shortest route is via Vilna, Rovno, Berdichef, and Kazatin. A third route is by Kiev, on the right bank of the Dnieper, one of the most ancient towns of Europe, which has been named the Jerusalem of Russia.

Nikoláev, Kherson, Sevastopol, Theodosia, Ghenichesk, Berdiansk, Mariupol, Taganrog, and Rostov are connected with the railway system of Russia. Rostov is also connected with Novorossisk on the Black Sea, and with Baku on the Caspian, via Vladikavkaz and Petrovsk. A railway is proposed connecting Vassurin, on the Ekaterinodar-Novorossisk Railway, with Taupse, thence along the shore of the Black Sea through Súkhum, forming a connection with the Trans-Caucasus Railway.

The Trans-Caucasus Railway, from the Black Sea to Baku on the Caspian, has a junction at Samtradi, which connects the branch lines from Poti and Batum. Between both places and the junction, about 64 miles, the railway passes through poisonous swamps and jungles. At Tiflis, 227 miles from Batum, there is a branch line to Kars and Erivan.

At Baku the oil wells, producing petroleum, number about 300, with varying depths of 100 to 800 feet, and the supply is apparently inexhaustible. The petroleum waste is extensively used for fuel on the Russian and Central Asia railways and in the steamers on the Black and Caspian Seas.

**Steamships.**—Prior to 1914 facilities for communication by regular steamers with the Dardanelles, Bosporus, and Black Sea were numerous and much augmented during the summer months by steamers carrying grain, and although some of the ports in the Sea of Marmara were only occasionally visited by regular steamers during that period, they often had direct communication with Europe. Chanak is not a port of call for British steamers, which generally proceed straight to Constantinople, after obtaining pratique, yet it

may be said to be almost in daily communication with the Mediterranean, Constantinople, and the Black Sea.

**Telegraphs.**—The telegraphic service in the Dardanelles, Bosphorus, and Black Sea was in normal times excellent. Chanak and Constantinople were in communication by cable with all parts of the world, and telegrams to Great Britain could be sent in English. Most places of any importance in the Marmara, Black, and Azov Seas were in telegraphic communication.

At certain signal stations, telegrams could be received from vessels by International Code and forwarded to their destination.

## CHAPTER II.

### THE DARDANELLES—FROM WESTERN ENTRANCE TO KILID BAHR AND CHANAK KALESSI—EUROPEAN SHORE.

**The Dardanelles**, leading from the Grecian Archipelago into the Sea of Marmara, separates Europe from Asia. The length of the strait in a general northeasterly and southwesterly direction is 35 miles, while its breadth, averaging about 2 miles, varies from 1,400 yards at its narrowest part to 4 miles at its widest. The depth in mid-channel is from 25 to 55 fathoms. The European side of the strait is for the most part steep-to, but the Asiatic shore is fringed almost throughout its length by a shallow bank extending in some places upward of  $\frac{1}{4}$  mile from the land.

The western entrance to the Dardanelles, 2 miles wide, is defended by two fortified castles, built by Mahomet the Fourth, on either side of the strait, and named Kum Kale and Seddul-Bahr, and near them are other fortifications.

There is a marked difference in the conformation of the two shores of the Dardanelles. The coast of Asia, generally flat toward the sea, extends in the form of an amphitheatre to the foot of Mount Ida. This vast plain, watered by numerous springs, is fertile and well cultivated. Shoals, banks, and ledges border the Asiatic coast line, which affords bays and roadsteads, most of which are good and easy of access.

The European coast is generally high and, almost without exception, steep-to. Partly from its cliffy character and partly from its superior cultivation (chiefly corn), it presents at times a uniformly yellow and apparently arid aspect. The Asiatic, less steep and more thinly populated, affords by its wooded hills and tree-covered plains and valleys an agreeable relief to the yellow glare of the northern side.

**Cape Helles.**—The European shore of the Dardanelles is the ancient Chersonese of Thrace. It commences at Cape Helles (Lat.  $40^{\circ} 2' 40''$  N., Long.  $26^{\circ} 11' 10''$  E.) or, as it is named by the Turks, Cape Greco, a high headland,  $1\frac{1}{2}$  miles in breadth, projecting to the southwest, and formed by three steep points of a white color. The westernmost, Cape Tekeh, is the ancient Mastusium Promontory; on the second point, Cape Helles, stands some ruins and a tomb said to be that of Protesilas; and on the third, or Cape Greco, is built the castle of Seddul-Bahr, which, with that of Kum Kale, defends the

entrance to the strait. The headland, though steep, is fronted by a flat of rock and sand, which extends seaward about 300 yards from Capes Tekeh and Helles.

**Cape Helles Light**, group flashing white, 78 feet above high water, visible 10 miles, is exhibited from a white hexagonal stone tower located near the extremity of the cape.

**The Castle of Seddul-Bahr**, a quadrangular inclosure, with solid walls, having low towers at the angles, stands on the side of the hill which slopes to Cape Greco, with its lower wall on the water's edge, and is the largest fortress (in acreage) in the Dardanelles. About 400 yards to the northwestward of it there is a battery, also one above Tekeh village; and on the height behind the castle there is a fort in ruins named Shahim-Kalessi.

The small towns of Seddul-Bahr stands on the hill beyond the castle. There is a pratique office here for the use of coasting vessels.

**Seddul-Bahr Light**, flashing green, 36 feet above high water, visible 5 miles, is exhibited from a white iron framework tower, located on the south point of the fortress.

**Anchorage.**—There is a slight indentation of the coast between Cape Helles and Seddul-Bahr, which affords an indifferent anchorage. The best berth is found in 7 fathoms, sand, with Cape Helles Light bearing  $334^{\circ}$  650 yards and Seddul-Bahr Light  $70^{\circ}$  800 yards. The 5-fathom curve lies about 300 yards from the shore line.

**Morto Bay.**—About  $1\frac{1}{2}$  miles east of Seddul-Bahr is another bold, steep, white point, named Eski Hisarlik, surmounted by De Tott's battery, which is now in ruins. Morto Bay, formed between Seddul-Bahr and Eski Hisarlik, extends about  $\frac{1}{2}$  mile into the land, and has a low sandy shore, except near its east end. It is almost filled by a shoal bank of sand and rock, which, curving around Seddul-Bahr, 200 yards from it, extends  $\frac{1}{2}$  mile off the shore farther east, where it turns in to the head of the bay. The eastern side of the bay is similarly choked. In the center of the bay there is a narrow opening in the shoal bank, which affords indifferent anchorage. The current runs across the mouth of the bay with great velocity.

**Aqueduct.**—Northeast of Seddul-Bahr and northward of Morto Bay, about 650 yards from the shore, are five hydrants, having the appearance of square pillars.

**Buoy.**—The eastern extremity of the bank off Seddul-Bahr, on the port hand entering Morto Bay, is marked by a red buoy in 6 fathoms, with 3 fathoms close inside it. From the buoy Seddul-Bahr Light-house bears  $262^{\circ}$  1,700 yards.

**Anchorage.**—Entering Morto Bay, bring the western hydrant to bear  $322^{\circ}$ , and steer for it, till about 400 yards past the buoy, anchoring in 14 fathoms about  $\frac{1}{2}$  mile west from Eski Hisarlik Point. The bay may be found a convenient anchorage for steam vessels entering

the strait just before sunset, but there is very little swinging room in it.

**Coast.**—From Eski Hisarlik Point to Namazieth Battery, 10 miles, the coast trends  $56^{\circ}$ , and is everywhere steep and barren, with a depth of 10 to 13 fathoms within a short distance of the shore. Two small indentations afford anchorage in cases of necessity, but they are not recommended.

**Suan Dere.**—There is anchorage in this creek 400 yards from the shore in from 10 to 13 fathoms.

**Anchorage.**—There is anchorage off the small valley of Avuzlar, 2 miles west of Kilid Bahr, but it is not recommended except in cases of necessity.

Vessels may also anchor  $\frac{3}{4}$  mile southwestward of Kilid Bahr, in 6 to 8 fathoms. The two last-mentioned anchorages are easily recognized by the many vessels which are seen there, but it must be borne in mind that a vessel should not anchor more than 400 yards from the shore, for farther off there is 24 to 27 fathoms.

**Water** may be easily obtained at these anchorages from the fountains on the coast, that to the northeastward of Avuzlar yielding a good supply of excellent quality; but if fresh provisions are required, they must be brought from the town of Chanak,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  miles on the other side of the strait.

**Nazamieth Battery.**—On the point, forming the northern side of the western entrance to the narrows, is an open earthwork, named Nazamieth; another battery is located 400 yards southwestward of it.

**Kilid Bahr Light**, flashing green, 30 feet above high water, visible 5 miles, is exhibited from a white iron column located near Namazieh Fort.

#### ASIATIC SHORE.

**Cape Yeni-shehr** (lat.  $39^{\circ} 59\frac{1}{2}'$  N., long.  $26^{\circ} 11\frac{1}{2}'$  E.), the ancient Sigeum Promontory, at which the eastern or Asiatic shore of the Dardanelles commences, may readily be distinguished by a hill about 230 feet high, on the summit of which is a large house, also by nine windmills, to the south of which is the village of Yeni-shehr. Northeast of the cape, and a short distance inland, are two conspicuous tumuli, which are said to be the tombs of Achilles and Patroclus.

**Yeni-shehr Bank.**—Cape Yeni-shehr springs from high lands, perpendicular on the side toward the sea, but terminates on the shore in a low point of land from which a wide and dangerous bank, with 1 to 3 fathoms water, extends  $\frac{1}{2}$  mile from shore, and follows the trend of the coast to the northeast as far as Kum Kale, where it extends 200 yards from the land. The northwestern part of this bank is reported to be extending.

**Anchorage.**—Southward of the Yeni-shehr Bank there is an anchorage much used by tugs, or vessels waiting for a fair wind. The best berth is in 12 fathoms, with Cape Yeni-shehr bearing  $39^{\circ}$  and the tumulus on Demetris Point  $146^{\circ}$ .

**Coast.**—From Cape Yeni-shehr the coast trends northeastward about  $1\frac{1}{2}$  miles, and then northward to a point on which is built the new castle of Asia or Kum Kale, an old stone castle.

**Kum Kale Light**, flashing red, 36 feet above high water, visible 4 miles, is exhibited from a mast on a white house located at west battery, south side of western entrance of the Dardanelles.

**Mendere River** rises at the foot of Mount Ida, crosses the plain of Troy, and empties into the strait about 400 yards eastward of the castle of Kum Kale.

**Mendere Bank**, a continuation of the mud bank which lies off-shore in the vicinity of Kum Kale, extends a distance of 1,400 yards from the shore eastward of Kum Kale and is steep-to.

**Buoy.**—The northern part of Mendere Bank is marked by a red and white buoy in 7 fathoms,  $1\frac{1}{2}$  miles eastward from Kum Kale.

**Kavanlik Liman.**—Vessels frequently anchor in Kavanlik Liman, the bight between Kum Kale and the most projecting portion of Mendere Bank, awaiting a fair wind; but caution is necessary, the edge of the bank being, as already remarked, steep-to. Navigators unacquainted with the locality should not anchor in less than 14 fathoms water. The best holding ground will be found westward of the buoy and on a line joining the buoy to Kum Kale Point. The bottom is mud and gravel, but within this line the water shoals rapidly.

**Aren Kioi (or White Spot) Bay.**—The coast is low and swampy for 2 miles east of Kum Kale, after which it becomes steep and cliffy for 7 miles, till Kephez Point is approached. The summits of the hills on the coast are 600 to 700 feet high. Vessels may anchor in almost any part of this bay. Soundings of 10 or 12 fathoms will be found 300 to 400 yards from the shore and 21 to 24 fathoms over muddy bottom at 1,000 yards. A good berth is with the north part of Aren Kioi or Ghelmez village (situated about 1 mile inshore), bearing  $157^{\circ}$  in 16 fathoms, about 600 yards from the shore. In Aren Kioi Bay avoid, as a general rule, anchoring in less than 10 fathoms, because at this limit the soundings decrease rapidly, and there might be danger of taking the ground in swinging. The roadsteads are easy to recognize, when entering the strait, by the numerous vessels generally to be seen at anchor in them. In one or two indentations of the coast landing is possible, and there is a small pier about  $2\frac{1}{2}$  miles eastward of Kum Kale Point.

**White Cliffs (or Aspra Homata) Anchorage** is situated  $2\frac{1}{2}$  miles  $199^{\circ}$  from Kephez Point, near some conspicuous white cliffs.



The anchorage is in 12 fathoms, abreast the White Cliffs, 600 or 800 yards from shore, with Kuz Kioi (Kuz village) bearing 121°. There is a pratique office here for the use of coasting vessels.

**Water.**—There are some springs of good water near the shore, about  $\frac{1}{3}$  mile north of the White Cliffs.

**Kephez (or Barbers) Point** (lat. 40° 6½' N., long. 26° 23' E.).—Kephez Point is low, flat, and distinguished by its white appearance. There is a battery to the northward on the highest part, and an old fort in ruins to the southward.

**Kephez Point Light**, flashing red, 59 feet above high water, visible 12 miles, is exhibited from a white iron tower located on the southwestern extremity of the point near the battery, which is in ruins.

**Kephez Shoal.**—A bank, composed of mud and sand, extends along the shore for 1 mile to the southward of Kephez Point. This bank is a continuation of the shoal ground which skirts Aren Kioi Bay. There is not more than 1½ fathoms on the bank; close to the shore, are two small rocks awash.

**Buoy.**—The south elbow of the shoal ground, which skirts Kephez Point, is marked by a red and white buoy moored in 6 fathoms, 800 yards 228° from Kephez Lighthouse.

**Anchorage.**—There is anchorage about 50 yards southward of this buoy, in the bight named Kephez Bay, which will accommodate a number of vessels.

In Aren Kioi Bay, in a zone of 1 mile, from and parallel to the shore, slight eddies are met with, which favor navigation and assist vessels in working up the strait to Kephez Point. The inshore limit of the prevailing current is shown by a line on the chart.

**Caution.**—Great caution is required when closely skirting Kephez Shoal, in order to avoid the strength of the current. The shoal is curved, and the buoy is placed slightly to the northward of its actual extremity, so that a vessel passing round very closely, runs a great chance of striking. Vessels are frequently stranded here.

**Ancient Dardanus** (lat. 40° 5' N., long. 26° 23' N.).—On a low hill at the back of Kephez Point stand the foundations of what is supposed to be the town of Dardanus, a city older than Troy.

**Sari Siglar or Chanak Kalessi Bay.**—From Kephez Point the coast trends about 1 mile in an easterly direction, thence northeast and north 2½ miles to a point similar in formation to Kephez Point, and on which stands the Old Castle of Asia or Chanak Kalessi. A bay is thus formed 2¾ miles in length from point to point and 1 mile in depth, skirted with banks of sand and mud which have less than 3 fathoms on them, and extend 600 to 1,200 yards from the shore.

At the northern part of the bay the bank extends 800 yards from shore, has less water, and is steeper.

Entering the bay from the southward, Kephez Light should be kept to the southward of  $225^{\circ}$  to avoid the shoals in the southern part of the bay; the red tiled slaughterhouse near the beach, about  $\frac{1}{4}$  mile southward of Chanak Kalessi, with several bathhouses near it, may be steered for when bearing  $56^{\circ}$ , until the western wall of Chanak Kalessi is in range with the guardhouse southward of Keoseh Kalessi, bearing  $14^{\circ}$ , when anchorage may be taken as convenient.

Vessels proceeding eastward entering the Dardanelles at night may proceed as far as the anchorage below the Inner Castles (Chanak Kalessi and Kilid Bahr), but not farther, between sunrise and sunset.

**Warning.**—Vessels contravening upon this order will be fired on.

**Anchorage.**—Vessels anchor in Sari Siglar Bay in 10 to 13 fathoms water, muddy bottom,  $\frac{1}{4}$  mile from the shore and  $1\frac{1}{2}$  miles to the southward of Chanak Kalessi. The best anchorage in the bay is in the center, in 10 fathoms, with the right extreme of Namazieh Fort bearing  $339^{\circ}$  and the slaughterhouse  $38^{\circ}$ . Sari Siglar Bay is the best anchorage in the Dardanelles.

#### FROM KILID BAHR AND CHANAK TO KARAKOVA BURNU AND BERGAZ CHAI—EUROPEAN SHORE.

**Kilid Bahr.**—The castle of Kilid Bahr (Key of the Sea, or Old Castle of Europe), standing on sloping ground on the edge of the strait, was built by Mahomet the Second, and is a picturesque stone fortress, of a heart or trefoil shape in plan, with a tall keep, of a similar shape, rising in its center. Close to the castle is the Cynossema or Tumulus of Hecuba.

**The town** of Kalid Bahr, of slight importance, stands on the side of the hills, which here rise to a height of 650 feet above the level of the sea. Its houses are constructed of wood and surrounded by a great number of cypress trees. The population is composed of the garrison of the fort only, and the town offers no resources to vessels which put in for shelter.

It has been already stated that the narrowest part of the strait is between Kilid Bahr and Chanak, between which the current sometimes attains a velocity of 4 knots; only with a fair wind can a sailing vessel make headway.

**Bank.**—Namazieh Point is free from danger, but adjoining it to the southward is a bank of sand and rock  $1\frac{1}{2}$  miles long, and 2 fathoms on it; it extends 100 yards from the land. The edge of the bank is steep-to.

**Coast.**—Beyond Namazieh the coast trends north-northwest for 3 miles to town of Maitos. This part of the coast is free from danger

and steep-to, except for one spot between Dermaburnu and Cham Kalessi, where a bank 400 yards long extends 100 yards from the coast. Between Namazieh and Cham Kalessi the land rises abruptly from the water, but from the latter place to Maitos, a plain, with hills behind, borders the sea. There is no anchorage to be found on this part of the coast; the current sets strongly on it, and then toward the Asiatic shore.

**Dermaburnu Battery** is a small earthwork, standing at the water's edge  $\frac{1}{2}$  mile beyond Kilid Bahr.

**Cham Kalessi** (lat.  $40^{\circ} 10' N.$ , long.  $26^{\circ} 22\frac{1}{2}' E.$ ), 1 mile north-northwest of Dermaburnu Battery, is an old whitewashed stone fort. The fort stands low, and is half hidden behind a cliff which slightly projects to southward, in which direction, about 400 yards, there is a small battery.

A battery named Kiamleh is situated a little to the northward of Maitos, on a hill 400 feet high, which slopes toward the strait, and to the southward of Khelia Tepe, on a hill 300 feet high, there is also another battery.

**Maitos (ancient Madytus)** stands on a low cliff at the end of the valley that extends across the peninsula at this point, and at the foot of Maitos Tepe, which forms the north side of that valley. It is a small town, with a large conspicuous Greek church standing in the center and several windmills in a line to the north and south of the town. There is a small cotton factory at the north extremity of the houses, distinguished by its tall chimney.

Three miles northeast of this village the remains of an old castle are seen. The Turks have built there the village of Yallova; and between it and Maitos, on a slightly projecting low, flat, rounded point, formed at the entrance of the Bokali Valley, by the stream that runs down it, stands an old quadrangular whitewashed fort, named Bokali Kalessi, having a conspicuous minaret in its center and in an east-northeast direction.

At the north end of Maitos the coast makes an almost rectangular bend to the north and east, and thence maintains a general northeast by east direction to Gallipoli, 19 miles distant.

**Anchorage.**—There is anchorage off Maitos, in 17 fathoms, abreast the factory, 500 yards from the shore, but the anchorage is not recommended, as the current is variable in this locality. The coast bank here extends 200 yards from the shore.

**Khelia Liman**, situated  $\frac{3}{4}$  mile to the north of Maitos, is a well-sheltered bay facing southeast,  $\frac{1}{2}$  mile wide at the entrance and 800 yards long. The sides of the bay are formed by the steep slopes of Matios and Khelia hills, which are destitute of vegetation. A small river empties at the head of the bay.

**Anchorage.**—There is anchorage in the center of Khelia Liman, in 14 fathoms, and the shore is moderately steep; but the anchorage is seldom occupied, being subject to squalls and out of the track of vessels. Sailing vessels pass this part of the strait either with a fair wind or in tow of a tug.

**Water.**—Water may be procured from a fountain near some ancient ruins on the west side of the bay.

**Bokali Kalessi Light**, flashing green, 38 feet above high water, visible 5 miles, is exhibited from a white iron framework tower located on the forward fortress, 900 yards northeastward of Khelia Liman Bay.

**Mal Tepe**, a hill 520 feet high, situated  $1\frac{1}{2}$  miles northward of Khelia Liman, is conical and conspicuous, having the appearance of a large tumulus. Two miles inland is a small Turkish village, named Codjadere.

From the north point of Khelia Liman the coast trends northeastward round the foot of Khelia Tepe, past the mouth of Bokali Valley, and along the foot of the coast range to Sestos Point, 3 miles.

**Bank.**—A bank of 16 feet runs along the coast from Khelia to Bokali, and extends in some places about 300 yards from the shore, but beyond Bokali not more than 200 yards from shore.

**Anchorage.**—Under the lee of the point of Bokali a vessel can anchor in 12 fathoms, with the fort bearing  $34^{\circ}$  and Khelia Tepe  $275^{\circ}$ ; but as the water shoals very suddenly, it is not recommended.

**Submarine telegraph.**—Three hundred and fifty yards eastward of Bokali Kalessi, a submarine cable crosses the strait to Nagara Point. Its termination on the European side is marked by a stone house.

**Sestos Point** (lat.  $40^{\circ} 13\frac{1}{2}'$  N., long  $26^{\circ} 26'$  E.) is bluff and steep; near its extremity is a ledge, 20 feet above the sea, on which there is a road. The 3-fathom line of soundings which skirts the shores of Ak Bashi Liman is here 200 yards from the coast, and the bank is steep-to.

**Buoy.**—The southeast extremity of the bank is marked by a red buoy in 6 fathoms. From the buoy, Bokali minaret bears  $261^{\circ} 1\frac{1}{2}'$  miles.

**Ak Bashi Liman**, a bay of which Sestos Point is the southwest extremity, is  $\frac{3}{4}$  mile broad and  $\frac{1}{4}$  mile long. The north shores are low and sandy, and a small stream falls into the middle of the bay.

On the hills at the back of Sestos Point, forming the west side of Ak Bashi Valley, are the remains of an old Byzantine castle, 300 feet above the sea. The castle is not easily seen, as its walls are of the same color as the ground on which it stands, but a Tekeh or monastery adjoining it, surrounded by plane trees and cypresses, indicates its position.

**Anchorage.**—There is good anchorage in Ak Bashi Liman. A depth of 11 fathoms will be found in its center, with the brick kiln at the bottom of the bay bearing  $337^{\circ}$  400 yards.

**Coast.**—From Ak Bashi the coast, forming many small sandy bays, trends northeast for  $3\frac{1}{2}$  miles to Uzun Burnu; deep water will be found at 200 yards from the shore. A succession of small hills and cliffs rise to a central hill, 820 feet high, named Bakajak, which is, from most views, of a remarkable conical shape.

**Uzun Burnu** is very low. A bay, open to the east and the prevailing winds, is formed north of the point. A depth of 20 fathoms will be found  $\frac{1}{2}$  mile from the shore.

**Ulgar Dere.**—The Ulgar River empties into the strait a few yards to the northward of Uzun Burnu, and in winter is a fair-sized stream, but in summer only a small rivulet. To the southward of Ulgar Dere, the coast bank, which is composed of sand and mud, extends 300 yards from the shore. About 2 miles inland are the villages of Ulgar Kioi and Pazarli.

**Coast.**—From Uzun Burnu the coast extends in a northeasterly direction for 4 miles. It is steep, and can be approached within 200 yards except in the little bays opposite Bergaz, where shoal water extends 200 yards from shore.

**Indji Liman** is a bay formed by the projection of Karakova Burnu. In the center of the bay there is a good night anchorage, protected from northeast winds, in 7 fathoms 600 yards from the shore. In the northern part of the bay the bank extends 300 yards from the shore. The western side of Indji Liman is moderately high, the spurs from Bairak Tepe extending to the beach, but the north and east sides are low.

**Karakova Burnu** is a low sandy point having deep water 200 yards from shore. The Karakova River empties at the north end of the point, and in winter the whole coast is swampy.

**Karakova Burnu Light**, flashing green, 33 feet above high water, visible 5 miles, is exhibited from a white iron framework tower located on Point Galata at the eastern extremity of Indji Liman.

#### ASIATIC SHORE.

**Chanak Kalessi** is a massive quadrangular fort situated on the shore of the strait and at the north point of Sari Siglar Bay. The north point of Sari Siglar Bay is low and projects a little to the westward toward the coast of Europe, from which it is 1,400 yards. The point is free from danger; 200 yards from it the depth is 18 fathoms. In this, the narrowest part of the Dardanelles, the depth is about 50 fathoms, sand, stones, and shells, and the deep water is close to either

side. The prevailing southerly current runs with great velocity, leaving no slack or eddy near the shores, thus making these narrows the most difficult part of the strait to pass.

**Chanak Kelassi Light**, flashing red, 47 feet above high water, visible 6 miles, is exhibited from a white iron framework tower located on the low battery at the west side of the town.

**Rhodus River**, running south of the point and under the walls of the castle, discharges itself at the north point of Sari Siglar Bay, and carries with it in the winter time a great quantity of sand and mud, which gives a yellowish color to all that part of the channel. The river, nearly dry in summer, but in winter a torrent, is crossed by a large wooden bridge, which is seen from the strait.

A shoal, with a depth of 23 feet over it, is reported (1905) to have formed about 100 yards seaward of the entrance of the river.

**Chanak**, called by the Turks in ordinary conversation Chanak Kalessi, and in official correspondence Sultanieh, is known by Europeans as Dardanelles. It has a population of 22,000 and is probably the cleanest town in Turkey. The land at the back of the town forms the plain of Rhodus River, but 3 miles in the interior picturesque hills rise on either side of the river to a height of 1,500 feet. Chanak (the Turkish word for pottery) is the most important place in the Dardanelles and is the seat of Government of the Valyat of the Archipelago.

**Communication.**—Chanak not being a port of call, only the mail steamers stop regularly, British steamers generally proceeding direct to Constantinople after obtaining pratique. Daily communication with Constantinople and Europe may be obtained. There is telegraphic communication with nearly all parts of the world by Eastern Co.'s cables, also a Turkish telegraph line, and a military telegraph communicating with forts on the European side.

**Signal station.**—A signal station is established at Chanak, a short distance north of the castle.

**Repairs.**—Divers using the latest diving apparatus, and capable of effecting temporary repairs to a ship's bottom, are to be found here. There are a few shipwrights and blacksmiths in the town, but no appliances for effecting repairs.

**Pilots.**—Pilots for the Dardanelles and the Sea of Marmora to Constantinople may be obtained here.

**Tugs.**—Chanak is the headquarters of the tugs which lie in Dardan Bay. Masters of vessels are advised to get the assistance of their consul in concluding a bargain for towage, for there is no fixed tariff and the prices sometimes paid are enormous. The tugs usually tow two or three vessels at a time.

**Pratique.**—All ships bound for Constantinople and Black Sea ports must stop here. It is best to time navigation to arrive at sunrise.

**Hospital.**—There is a Turkish military hospital. Foreigners can be received by permission of commandant.

**Dardan Bay** (lat.  $40^{\circ} 9\frac{1}{2}'$  N., long.  $26^{\circ} 24\frac{1}{2}'$  E.).—To the north of Chanak Point the coast curves and forms a bay, which is 1 mile across from north to south. Dardan Bay, however, is not a good anchorage, for its shore is bordered by a hard bank of gravel, sand, and rock, having a depth of 9 to 18 feet, and which extends 400 yards from the shore. Outside the bank the water deepens suddenly to 20 fathoms. The current sets strongly to the southwest in the middle and along the south shore of the bay abreast the town of Chanak, but along the east and north shores it almost always runs to the northward; and as vessels must necessarily anchor near the line of separation between the two currents, they will be alternately in either current. Small vessels use the anchorage, also the tugs, which lie in the shoal water.

**Medjidieh Battery.**—At the north side of Dardan Bay low hills again come close to the coast line. Under these, and on the north point of the bay, stands the earthwork battery of the Medjidieh.

**Anchorage.**—The best berth is in the northern part of the bay, in 18 fathoms, mud, with the west end of the Medjidieh Battery bearing  $5^{\circ}$  and the barracks in the depth of the bay, east. The shoal in the north part of the bay is almost awash, and extends 200 yards from the shore.

The anchorage in Dardan Bay has been reported to be foul in places on account of the moorings of buoys which have foundered; also anchors and cables lost from ships.

From Medjidieh Battery there is good anchorage along shore as far as Nagara Point, in 10 to 16 fathoms, 400 to 800 yards from the land.

**Caution—Submarine telegraph.**—Vessels are cautioned not to anchor in the vicinity of the submarine telegraph cable, which passes from the north angle of Chanak Kalesi to the north angle of Kilid Bahr. .

**Firman.**—In Dardan Bay all vessels of war must stop and show their firman for passage and obtain pratique before they are allowed to proceed through the strait; and though merchant vessels are no longer under this restriction, it is one of the places where vessels can get the necessary visé to their bills of health in order to receive pratique at Constantinople.

**Keoseh Kalesi.**—A small, low, flat point projects slightly  $\frac{3}{4}$  mile to the northward of the Medjidieh Battery, and on this is built Keoseh Kalesi, which is an old stone fort.

**Nagara Bay (Liman)** may be said to commence to the north of Keoseh Kalesi. There is good anchorage, in 10 to 16 fathoms 400 to 800 yards from the shore, in any part of the bay, well protected

from northeast winds and out of the current. The best berth is north of the landing place called the Tekeh. All Nagara Bay is in the eddy current which runs to the northward, the strength of which depends upon the strength of the main current. The Turkish fleet usually lies in this bay.

**Nagara Point** (lat.  $40^{\circ} 12' N.$ , long.  $26^{\circ} 24\frac{1}{2}' E.$ ), a long, low, sandy spit, which projects to the westward from the coast hills 1,600 yards, is distinguished by a large white square fort, Nagara Kalessi, at the northwest angle of which there is a mosque, also white, frequently mistaken for the lighthouse. This fort is built on the site of the ancient castle of Abydos; there is a battery  $\frac{1}{2}$  miles southeast from it, and another one south of Abydos Point.

A submarine telegraph cable crosses the strait from Nagara Point to Bokali Kalessi.

**Nagara Point Light**, flashing white, 36 feet above high water, visible 5 miles, is exhibited from a circular white tower on the point.

**Nagara Spit.**—The extremity of Nagara Point is a sharp-pointed bank of sand that runs out to the westward, shelving gradually under water 400 yards from the parapet of the fort, where it drops to 4 fathoms. Outside this the water gradually deepens to 6 fathoms 800 yards from the fort. The bank appears to extend much farther from the shore, but this appearance is simply due to discolored water running along the coast and round the spit.

**Buoy.**—A buoy, painted white and exhibiting a flashing red light, 10 feet above high water, visible 2 miles, is moored in  $5\frac{1}{2}$  fathoms 600 yards west of Nagara Point Lighthouse.

The current, the direction of which is here  $244^{\circ}$ , sets strongly over the end of the bank and past the buoy. Vessels should not attempt to pass inside the buoy as the water shoals suddenly.

**Firman vessel.**—The firman vessel, a small hulk, painted black, is moored 1,950 yards  $186^{\circ}$  from Nagara Lighthouse and 300 yards from shore in Nagara Bay, where every ship on her return voyage is bound to stop and deliver her bills of health, etc. The vessel has one mast with a yard, and at night exhibits one red light over two white lights, placed triangularly.

A tug, painted white, stationed near Nagara Point, will come alongside, and take the firman, bills of health, etc., to the firman vessel, for a nominal fee.

In Nagara Bay, eastward of the fort, is the lazaretto, a large yellow house.

**Abydos Point** (lat.  $40^{\circ} 12' N.$ , long.  $26^{\circ} 25' E.$ ).—From Nagara Point the coast trends  $70^{\circ}$ , a little more than  $\frac{1}{2}$  mile, at which part the line of grass-covered low coast hills from Dardan Bay extend to the shore, and form Abydos Point, which is a steep-looking cape, about 100 feet high, and shows green or yellow, according to the



season. It is steep-to, but the bank of rock and sand extends only 100 yards from the shore, when it deepens suddenly to 13 fathoms. About  $\frac{3}{4}$  mile south of the point, on this range, is an old redoubt that stands up very prominently over Nagara Bay.

**Coast.**—From Abydos Point the coast runs in an easterly direction for 3 miles, and then curves round to the northeast for 6 miles to Kodjuk Burnu, the shore being indented by small shallow bays and skirted by a bank of sand and mud, extending in some places  $\frac{1}{2}$  mile.

This bay is well sheltered from all southerly winds, but a vessel could only lie here in fine weather if the wind blew from the northeast. On all this part of the coast an eddy exists, which, though weak, is made use of by sailing vessels.

**Abydos Bank**, about  $\frac{1}{2}$  mile in extent, with 16 feet on its shoalest part, lies from  $\frac{1}{2}$  to 1 mile east of Abydos Point, and about 900 yards from the nearest part of the shore.

**Clearing mark.**—The summit of Maitos Tepe, kept a little open of Abydos Point, 260°, leads in 4 fathoms clear of Abydos and Ay' Iani banks. Between Abydos and Ay' Iani banks a depth of 5 fathoms will be found 300 yards from the shore.

**Ay' Iani or Towshan Point** is low, rocky, and white, and composed of a conglomerate of oyster shells.

**Bes Chamlik or Seven Firs** (lat. 40° 11' N., long. 26° 27' E.).—At the back of Ay' Iani Point, and 1 mile inland, stands a conspicuous clump of seven fir trees, known by the Turks as Bes Chamlik.

**Ay' Iani Bank.**—From Ay' Iani Point the coast bank of that name extends northeast about 900 yards, at which spot there is a depth of 8 feet; the edge of the bank then turns to the eastward, and  $\frac{1}{2}$  mile farther on approaches the shore to within 400 yards. The general depth on the bank is 2 fathoms.

**Coast.**—Kair Burnu, low and formed of white rock, is similar in appearance to Ay' Iani Point. From it the land again sweeps round to the southeast and northeast, forming a shallow bay to the point where Moussa Kioi River empties into the sea. Thence the coast extends, with little deviation, northeastward 2 miles to Saltik Liman Burnu.

**Moussa Bank**, a projection of the coast bank, lies off the mouth of Moussa Kioi Chai, a depth of 3 fathoms being found at 700 yards from the shore. Yapildak River,  $\frac{1}{2}$  mile eastward of Moussa Kioi Chai, may be known by a flat piece of land immediately northeast of the river. Both these rivers, though not absolutely dry, cease running in the summer, and except in time of floods are never more than small streams.

**Buoys.**—The northwestern extremity of Moussa Bank is marked by a red and white buoy moored in  $4\frac{1}{2}$  fathoms.

**Clearing mark.**—Should the buoy not be seen, Bes Chamlik, in range with Kair Burnu,  $225^{\circ}$ , will lead to the north of Moussa Bank in 15 fathoms. Yapildak Tepe, a conical tree-covered hill, bearing  $125^{\circ}$ , will lead to the eastward of it in 5 fathoms.

**Anchorage.**—After passing Moussa Bank a vessel can approach the shore, within 300 yards, as far as Saltik Liman Burnu. There is excellent anchorage all along this shore, especially in the bight between the Moussa and Ay' Iani Banks, in 12 fathoms, mud, and vessels working up are recommended to anchor on this side of the strait in preference to the other, as the water is shoaler and the eddy favorable.

**Aspect.**—All the shore from Ay' Iani to Yapildak Chai is low, and in many places swampy in winter. Behind this plain, however, the hills rise gradually, till, 9 miles inland, they culminate in the fine pyramidal peak of Aghi Dag, 3,010 feet above the sea. This part of the country is poorly cultivated, but several villages are scattered throughout it, the whole presenting to the eye an agreeable picture, large numbers of trees covering the valleys and slopes.

The villages seen from the strait are: Kemel, high up the hills behind Ay' Iani, and just under a large dark quadrangular plantation; Okjolar, a small village farther to the northeast; Kezil Kechili, a little below the last; Yapildak, of which only a minaret and a few houses are visible from the sea, over the trees of Yapildak Tepe. None of these villages are conspicuous, except in certain lights, when the white minarets and mills shine out brightly.

**Bergaz Iskalessi** (lat.  $40^{\circ} 15\frac{1}{2}'$  N., long.  $26^{\circ} 33\frac{1}{2}'$  E.), a bay 1,400 yards across, and open to the northwest, lies northward of Saltik Liman Burnu, a conspicuous headland of white rock, 70 feet high, and the only rocky point in the neighborhood for some miles; the north point of the bay is low and sandy. A conspicuous knot of trees, named Bergaz Clump, is situated on the northeast summit of some hills  $1\frac{1}{2}$  miles inland and when bearing  $147^{\circ}$  leads into Bergaz Iskalessi, but the trees disappear when the vessel is close inshore, the coast range riding them. Bergaz Iskalessi is the place of embarkation for the produce of the rich valley of Bergaz and the district connected with it. A few fishermen's huts are situated at the bottom of the bay.

**Anchorage.**—Ships anchoring in Bergaz Iskalessi must be careful not to run too far into the bay, as the 3-fathom curve extends 500 yards from the coast and then quickly deepens to 7 fathoms. The best anchorage is in 14 fathoms, mud, with the lighthouse on Kodjuk Burnu showing just outside of the north point of Bergaz Iskalessi.

**False Bay.**—To the northeastward of Bergaz Iskalessi another small bay is formed, filled by a sand bank, with only  $1\frac{1}{2}$  fathoms at its edge, which projects 200 yards outside the bay. The shore is low and sandy, and vessels frequently ground in this bay.

**Bergaz Asmak River.**—The bank in False Bay has been formed by the débris brought down by the river Bergaz Asmak, which runs into the bottom of False Bay, and is in summer a lagoon, but in winter is fed by the water from Kangarli hills.

**Bergaz village**, exhibiting three minarets, is comparatively large, and situated 3 miles from the coast on the hills facing the strait; the village is visible from a vessel in the channel. On the hills bordering the plain of Bergaz are also the hamlets of Kangarli, Giok Kioi, and Sandal Ovasi, but none of them are visible from the strait. Over the hills is again seen the summit of the mountain Aghi Dagh.

**Kodjuk Burnu** (lat.  $40^{\circ} 16\frac{1}{2}'$  N., long.  $26^{\circ} 34\frac{1}{2}'$  E.) is a low, flat, rounded point, and from a distance appears to project much farther into the strait than it actually does. The lighthouse, which stands on the extremity of the point, appears also to rise from the water itself. The point is nearly steep-to, the shoal water not extending more than 100 yards from the shore, and the strait is here narrowed to  $1\frac{1}{2}$  miles. The land of which Kodjuk Burnu is a part is the end of the large valley and plain of Bergaz, which extends from the shore in a southeasterly direction. The mouth of the Bergaz River is situated 1 mile to the northeastward of the lighthouse, and is never entirely dry.

**Kodjuk Burnu Light**, flashing red, 38 feet above high water, visible 6 miles, is exhibited from a white iron framework tower located north-northwest of Bergaz village.

**Bergaz (or Fisherman) Bank.**—Beyond the lighthouse the shore of Kodjuk Burnu, or point, gradually curves around to the east, and then sweeps in east-southeastward, forming a bay of some depth. At the point where this bay commences, Bergaz River empties into the strait, and has deposited, opposite to its mouth, a bank which fills all the bay. The 3-fathom curve of soundings is 800 yards from the shore, the 5-fathom curve extends 1,400 yards, and the portion of the bank between these depths makes a good overnight anchorage, the holding ground being good.

**Buoy.**—Bergaz Bank is marked by a red and white buoy, lying on the center of the outer part of the shoal in 4 fathoms, with Bergaz Lighthouse bearing  $241^{\circ} 11\frac{1}{2}$  miles. Small vessels can pass inside this buoy in working up, but it is not recommended for a stranger to do so.

#### FROM KARAKOVA BURNU AND BERGAZ TO THE SEA OF MARMARA—EUROPEAN SIDE.

**Coast.**—The Greek villages Galata and Bahir are conspicuous, as they stand on the summit of the coast range. Galata is  $\frac{1}{2}$  mile from the sea, and Bahir  $1\frac{1}{2}$  miles. There are a number of windmills close to both villages.

Beyond the entrance to Karakova River the coast trends in nearly a straight line 3 miles to Galata Burnu, with a sandy beach, and is steep-to.

**Galata Burnu**, the southwest termination of the Bay of Gallipoli, is a low point, at the back of which is the plain formed by the entrances of the valleys of Kusu Dere and Buyuk Dere that circle round the mountain of Ak Yarlar.

**Buoy**.—Off Galata Burnu is a red buoy, in 8 fathoms, 250 yards from the shore. Close inshore of the buoy there is a depth of 3 fathoms.

**Gallipoli Bay**.—From Galata Burnu the coast trends to the north and east, forming Gallipoli Liman (or bay), which is 3 miles broad and about 1 mile long. The bay is divided into two nearly equal parts by a point, which projects about 800 yards into the channel. The shores of the bay for the most part suddenly terminate in low yellow cliffs, about 80 feet high, with small ravines between. The low tablelands that form the immediate background are destitute of trees and present a desolate appearance. The mountain of Ak Yarlar, 1,050 feet high, with its picturesque white and yellow chalk cliffs, bears  $257^{\circ}$  from the town of Gallipoli.

The southwestern portion of Gallipoli Bay is skirted by a rocky shoal, in some places nearly awash. The shoal is  $\frac{1}{2}$  mile long and extends 600 yards from the shore.

**Middle Bank** (lat.  $40^{\circ} 24' N.$ , long.  $26^{\circ} 39\frac{1}{2}' E.$ ) fills the northeastern half of Gallipoli Bay. The center and most projecting part of the bank lies 1 mile  $250^{\circ}$  from Gallipoli Point, and nearly 800 yards from the shore. Here the soundings suddenly diminish from 5 fathoms to 16 feet, then shoaling toward the shore.

A tall chimney near Utze Bridge, bearing  $32^{\circ}$  and in range with the easternmost of a row of mills to the north of the town, will lead clear of the bank. This bridge is a wooden one and spans a small stream called the Utze Keupri Dere (Three Bridges Valley).

**Anchorage**.—The anchorage in Gallipoli Bay is much frequented by sailing vessels as a night anchorage when working to windward. It is well protected from all winds except those from south and east. These winds, however, raise but little sea, and the holding ground is good. The best berth is just to the eastward of the bearing of the clearing mark given for Middle Bank, where good holding ground will be found in 9 fathoms, with the south point of the town bearing  $99^{\circ}$  1,200 yards. Near the town, and in a more convenient position for communicating, the water is deeper. The swell from the Sea of Marmara sets around the point.

There is also anchorage on the west side of the bay, on a bottom of mud, in 8 to 9 fathoms. Vessels are well sheltered from northeastward, but they will have the whole force of the wind from the east-

ward, and would be in an awkward position if it came on to blow hard.

Another good anchorage is, in 14 fathoms, with the Pacha's office (a conspicuous yellow house which stands on a low conical hill in the center of the town) in line with the health office (a yellow house on the shore to the north of the camber).

**Gallipoli Point** (lat.  $40^{\circ} 24' N.$ , long.  $26^{\circ} 41' E.$ ).—The east point of Gallipoli Bay is rocky, and foul ground extends off it to a rock with 12 feet over it which lies  $248^{\circ} 100$  yards from the point. There is deep water close outside the rock.

From Gallipoli Point the shore trends northeastward for  $\frac{1}{2}$  mile, forming the sea face of the town of Gallipoli. This piece of the coast is all rocky, with low perpendicular cliffs, and outlying rocks extending about 60 yards from it. The coast then sweeps in round the lighthouse point to Baschesme Liman, the north anchorage of Gallipoli.

**Gallipoli Light**, flashing white, 111 feet above high water, visible 15 miles, is exhibited from a white masonry tower located on the cliff northeast of the city.

**Gallipoli**, the largest town on the Dardanelles, is built on the rocky promontory between Gallipoli Bay and that of Baschesme, and has a population of about 13,000, consisting of Turks, Greeks, and Jews. The town, which is the seat of government of the Province of Gallipoli, in the Vilayet of Adrianople, possesses many mosques and minarets, and has great notoriety as a burial place for Mussulman saints. Its cemeteries are very extensive. There is a telegraph station.

**Cambers**.—On the south side of Gallipoli Town are two small cambers. The outer one has an area of  $1\frac{1}{2}$  acres and a depth of 7 feet, with an entrance 30 feet wide, and is much used by coasting craft.

The inner one, by the side of which is an old Genoese tower, is about one-third the size of the other, and not much used.

**Quarantine**.—The health office, which stands just west of the entrance to the port, is a yellow building. Vessels in quarantine are not given pratique here, unless pratique has been already given at Chanak or Constantinople. They are permitted to take in provisions and send telegrams if they have health guardians on board.

Coasting vessels can obtain pratique here.

**Baschesme Liman** is situated on the north side of the promontory of Gallipoli. Round its rocky south point the coast trends west, and then, losing its rocky character at once, sweeps round north with a sandy beach for 800 yards, when it turns east and again becoming rocky, runs with little indentations 1 mile to the north point of the bay, called Eski Fanar Burnu.

**Anchorage.**—There is anchorage in Baschesme Bay, in 13 fathoms, about 500 yards from the shore, with Gallipoli Lighthouse bearing  $223^{\circ}$ . There is no protection here from northeast winds; a considerable swell sets in, and the holding ground is not so good as that of Gallipoli Bay. Shoal water extends from the sandy bottom of the bay for 200 yards, and a northeast wind makes a heavy surf in it; otherwise the bay is clear of danger.

**Water.**—Landing can generally be effected in the northwest corner of Baschesme Bay, under the lee of a small rocky point, not far from the fountain that gives its name to the bay and where casks can be filled in boats.

**Eski Fanar Burnu** (lat.  $40^{\circ} 25' N.$ , long.  $26^{\circ} 42\frac{1}{2}' E.$ ) is a rocky point, about 25 feet high, on which stands Gallipoli old lighthouse, a square white tower, 30 feet high. Off the point, rocky ground of 6 fathoms depth, on which the water is much discolored, extends for about 200 yards.

**Coast.**—From Eski Fanar Burnu the land trends north for 2 miles in a long extent of sandy bay, having deep water within 400 yards. An isolated remarkable rock named Chan Kair lies on the beach 800 yards north of the point. The plain behind this bay is called Ok Meidan, and is well cultivated. Through it passes the road from Gallipoli to the interior, across the Isthmus of Bulair.

From the head of this bay the coast trends east-northeast past the foot of Karaïokus Hills, then stretches away with very slight deviations from a straight line for 30 miles, forming the north shore of the western part of the Sea of Marmara. In the northern part of the bay a shoal bank of less than 3 fathoms extends off the land for 700 yards, but gradually closes the shore, till 1 mile farther east it is but 200 yards.

#### ASIATIC SHORE.

**Coast.**—From the mouth of Bergaz River the coast trends east-southeast for  $\frac{3}{4}$  mile, and then northeast for  $5\frac{1}{2}$  miles, with a few small indentations, as far as Lampsaki. All the shore line is low and composed of either sand or shingle, but from the bottom of the bay above the river, eastward, the land rises at once, and thence gradually to the summit of the Leskioi Tepesi Range, 3 miles inland, where the hills rise to 1,230 feet above the level of the sea. The background, one monotonous uniform slope, without cultivation, house, or feature of any kind to relieve it, is covered with short scrubby brushwood.

**Lampsaki Liman**, formed by the curve of the land to northward, is 1 mile across from the low point on the southwest which juts very slightly into the strait, and on which stand five windmills in a row. Chardak Ova, the northern point of the bay, which is also low, is the extremity of a flat plain, projecting from the foot of the hills behind.

**Anchorage.**—Good anchorage may be obtained in Lampsaki Bays with protection from northeast winds, but there is a bank, with a steep outer edge, extending from the shore 550 yards, which necessitates caution in anchoring.

The best berth is in 19 fathoms, 1,200 yards  $209^{\circ}$  from Chardak Ova, with the outer mill of Lampsaki bearing south, and a large rounded tree at the bottom of the bay  $101^{\circ}$ . In this position slack water, or an eddy current, never very strong, will be found, and vessels are well protected from the swell from the Sea of Marmara. In the northeast part of the bay the shore is steep-to.

**Lampsaki** (lat.  $40^{\circ} 20\frac{1}{2}'$  N., long.  $26^{\circ} 41\frac{1}{2}'$  E.).—On the south shore of the bay is Lampsaki, a small town possessing a conspicuous mosque and minaret and surrounded by trees. The town is prettily situated, on a slightly rising slope, at the northern entrance of the Valley of Kush Ovasi, through which the Lampsaki River runs, and empties into the sea 500 yards southwest of Lampsaki Point.

The town, which has a population of about 1,400, is unhealthy, probably from the swampy nature of the land at the mouth of the river, combined with the bad quality of the water, which is said to produce fever. The water is brought from the hills by pipes, which supply the fountains in the town, whence it is obtained in casks. Quantities of vegetable produce, besides cattle, sheep, and wine for Constantinople, are exported. There is a telegraph station at Lampsaki, and a pratique office here for the use of coasting vessels.

**Chardak Bank.**—From Chardak Ova the coast takes an east-northeast direction for  $1\frac{1}{2}$  miles to the mouth of Chardak Lagoon. Shallow water of 3 fathoms and less extends from Chardak Ova Point 400 yards. It then follows the direction of the coast 600 yards to Chardak Lagoon.

**Buoy.**—A red and white buoy is placed in 6 fathoms off the extremity of the bank near Chardak Ova. Close inside of the buoy is a depth of 2 fathoms, and, as the edge of the bank is round and broad, it must not be passed too closely.

**Chardak Liman.**—Northeastward of Chardak Ova is another bay, formed by the abrupt projection of Chardak Spit to the northwest. The entrance to Chardak Lagoon is at the northeast part of this bay, and the bay, though bordered for 600 yards by the shoal bank above mentioned, forms another good night anchorage for a vessel about to work through Gallipoli Strait. The village, containing a population of about 1,200, is pleasantly situated on the well-cultivated plain, bordering the sea at this part, with the hills of Kale Bair rising behind to a height of 830 feet.

**Anchorage.**—A vessel may anchor, 300 yards from Chardak Burnu, in 14 fathoms, with the lighthouse bearing  $27^{\circ}$ , and the domed mosque in the village of Chardak  $119^{\circ}$ .

**Chardak Burnu Light**, flashing red, 38 feet above high water, visible 6 miles, is exhibited from a mast on a white house located on the low sandy point.

**Chardak Spit and Lagoon.**—Chardak Lagoon is formed by a narrow strip of sand extending northeastward  $1\frac{1}{2}$  miles from Chardak Spit, and then joining the coast. The breadth of the lagoon at the entrance is 250 yards, widening inside 700 yards. Chardak Spit is steep-to on its southwest side.

The lagoon is supposed to have been the port of the ancient Lamp-sacus, but at the present day it is too shallow to be of use, except to the small coasters, who use it as a careening place. The depth of water at the entrance, where there is a small wooden pier, is 11 feet, shoaling to 8 feet, 200 yards farther in. The remainder of the lagoon is very shallow. It abounds with duck during the winter.

**Shoals.**—A patch of 18 feet lies  $\frac{1}{2}$  mile  $23^{\circ}$  from Chardak Burnu Lighthouse, and is connected with Zindjir Bozan Bank by a shoal of 24 feet. Patches of 24 feet and 27 feet lie 400 yards to the southwestward of the 18-foot patch.

**Gallipoli Strait**, the northeast entrance of the Dardanelles, is nearly 2 miles wide at Chardak. On the European side of the strait is the town of Gallipoli.

**Zindjir Bozan Bank.**—The edge of this bank, which is also known as Diana Shoal, extends from the shore near Chardak Burnu Lighthouse, in a  $53^{\circ}$  direction for 3 miles; it then turns east-southeast, and trends in again to the shore 1 mile beyond Fanous Hills. The edge of the bank at its northern extremity is 1 mile from the shore. Depths of from 2 to 4 fathoms will be found on the bank, but the bottom is uneven.

The outer edge of the west part of Zindjir Bozan Bank is everywhere steep-to. On the outer edge of the north part there are several small 3-fathom heads, outside of which the water deepens suddenly from 5-fathoms to 15 and 25 fathoms.

The northeastern side of the bank has no shoal heads on it. To the eastward of the northern 3-fathom patches a vessel can approach to within  $\frac{1}{2}$  mile of the bank.

**Buoy.**—A buoy, red and white in horizontal bands, exhibiting an occulting red light, 13 feet above high water, visible 5 miles, is moored 2,520 yards  $336^{\circ}$  from the ruins of Fanous Lighthouse.

**Clearing marks.**—Gallipoli Lighthouse, in range with the center of the remarkable white chalk cliffs, near the summit of the rounded Ak Yarlar Mountain, bearing  $257^{\circ}$ , leads in 12 fathoms to the north of Zindjir Bozan Bank, but very close-to. Care must be taken not to bring the lighthouse to the right, or north, of the center of these



cliffs. This mark is easily distinguished. The lighthouse is white, and the cliffs generally show white also. After rain they will, however, appear of a reddish yellow, and are not so conspicuous.

Chardak Lighthouse, in range with the center of Derebidi, a low, rounded hill near Saltik Liman Burnu, bearing  $220^{\circ}$ , will lead clear to the westward of the northwest edge of Zindjir Bozan. This will form a good clearing mark for a vessel when abreast the center of the shoal.

A vessel working to the eastward must be careful not to pass south of the clearing mark for the north part of the shoal until she brings the highest part of some white cliffs in range with the summit of Codja Flamur Hill  $136^{\circ}$ . This hill is easily distinguished by an enormous tree, towering above the other foliage on the hill and looking like a large stone, and when the tree bears  $144^{\circ}$  a vessel can stand in as close as  $\frac{1}{4}$  mile from the shore.

**Famous Hill.**—The coast line inside Zindjir Bozan Bank is low. Chardak Spit extends east-northeastward  $1\frac{1}{4}$  miles, and the shore then turns gradually round to the east, where there are some low cliffs and a small isolated hill 120 feet high, presenting a cliff on its sea face, and named Famous Hill. On the hill stands the ruins of an old lighthouse tower, long since abandoned.

**Winds and weather.**—In the Dardanelles, north and northeast winds prevail on an average nine months of the year, whereas the irregular westerly winds last scarcely three months, during which period it frequently happens that they are not felt in the archipelago, where it is generally a calm. The winds are most variable at the equinoxes, and generally any change from north to south will take place at new or full moon.

**Northeast winds.**—In winter northeast winds often blow hard for several days if the wind should have set in from that quarter after a squall. These winds are often accompanied by fog and snow. Navigation then becomes impracticable in the Dardanelles for a sailing vessel.

In the summer north and northeast winds are more constant. They are clear, agreeable, and moderate, and the barometer stands high. They spring up generally in the morning, die away with the setting of the sun, and are followed by light offshore breezes, chiefly in the deep bays. The regular but gentle sea and land breeze is called the Imbat, and prevails all through the archipelago for a considerable time. It lasts sometimes so long that it is not a rare occurrence to see 200 or 300 vessels in Tenedos Channel or in the other anchorages waiting a favorable and enduring breeze. With every slight southerly air they get underway, but only to shift from one

anchorage to another, and they reach the Sea of Marmara after having accomplished the distance by short stages.

When in the morning a luminous horizontal streak, level with the land, is seen in the eastern horizon (provided the streak is perfectly distinct, and topped with grey clouds), a breeze of wind from the northeast may be expected, which will freshen during the day and die away at night.

At the equinoxes, and in the winter, if the wind comes suddenly from the northwest or north with a squall and heavy banks of clouds, it will veer to northeast and blow hard for about three days. But generally the northeast wind does not blow hard for more than a day.

**Northwest winds** occur occasionally at all seasons, the barometer standing at about 29.85. During the summer these winds blow fresh and the weather is clear. In winter they are accompanied by heavy squalls.

When white clouds are seen rising from the coast of Europe, it is a sure sign that the wind will be from the northwest; and if the clouds revolve in rising, it will blow hard from that quarter. Heavy squalls will then sweep along the European shore, and if great care be not taken will cause serious damage to vessels under sail.

Thunderstorms sometimes occur. They come from all directions, but more generally from northwest, with violent rain and heavy gusts of wind from different quarters.

**Southwest winds** may occur in any month. In winter they are frequent, blow hard and bring rain; the sky is loaded with clouds, and the barometer usually stands at about 29.65 inches. It often happens that southwest winds, though very violent in the Mediterranean, hardly reach the archipelago, and fall calm at the entrance to the Dardanelles. Sometimes, however, they blow home to the strait, and there suddenly fly round to the northeast in a squall. Whenever a vessel approaches the Dardanelles, with the wind from west or southwest, however long it may have held, a good lookout should be kept for the least brightening of the horizon towards the Sea of Marmara, to prevent the vessel being taken aback by the sudden and dangerous shifts of winds. In autumn and in winter, after entering the strait with fresh southerly winds and clear weather, a vessel may almost be sure of finding the wind from the southeast in the Sea of Marmara.

In autumn the weather with southwest winds is clear. The wind veers to south in the Dardanelles, and southeast in the Sea of Marmara; and they are in one respect favorable to navigation, as the land is then very distinct.

Whenever in the night, in fine weather, with a clear sky, a heavy dew should fall, the wind is almost sure to come round to the west-

ward, and is sometimes the precursor of a violent west or southwest wind; but, although there is then a decided appearance of bad weather, the wind will generally, in a few hours, fall light, and, without reaching the Sea of Marmara, will subside in copious showers of rain.

During the period from March to September southwest and southeast winds are rarely experienced. At that time it is indispensable that vessels should take advantage of offshore winds, if it be only to shift from one anchorage to another. A light south wind will sometimes commence in the afternoon, veer to the north at midnight, and blow hard. The change will sometimes be preceded by rain, but more frequently by a calm, clear night with a heavy dew.

**Currents.**—In the Dardanelles the points projecting from the land have the effect of changing the course of the current by causing eddies, of which, in some parts of the strait, especially in the bays, advantage may be taken by a vessel proceeding eastward with a light wind. In general, along the coast of Europe, where the points are less prominent, there are few eddies; and on the coast of Asia, though favored by eddies in the bays, a vessel has to go through the whole strength of the current when rounding the points.

The strength of the current, which is variable, depends much upon the direction and force of the wind, and, as will be easily understood, upon the heavy rains and snows of winter, which swell the large rivers, falling into the Black Sea. At that time, when it blows hard from the northward, the violence of the current increases, especially in the narrows, where it has been known to attain during the first few days a velocity of 5 knots between the old castles (Chanak Kalessi and Kilid Bahr). During strong southwest winds the current is sometimes reversed. But this is unusual, and as northeast winds prevail nine months of the year, the southwesterly current may be regarded as almost permanent. From Gallipoli to Kum Kale, the average velocity of the current may be estimated at  $1\frac{1}{2}$  knots for the whole distance. The set of the current in various parts of the Dardanelles, which is now given, should be studied by the seamen in conjunction with the directions for proceeding through the strait under various conditions of wind and weather.

**Southwest Entrance.**—Between Kum Kale and Seddul Bahr the current sets west-southwestward an average velocity of  $1\frac{1}{2}$  knots, the maximum being about 3 knots. The current has a greater velocity on the Asiatic side, and runs along the edge of Yeni-shehr Bank with great velocity.

**Kephez Point.**—The current runs close past Kephez Point, but to the southward of it, along the Asiatic coast to Kavanlik Liman, there is an eddy extending nearly 1 mile from the land.

The main current again strikes the Asiatic shore on Mendere Bank, and runs along to Kum Kale Point with great strength.

**Sari Siglar Bay.**—On the Asiatic shore, in Sari Siglar Bay, there is an almost constant eddy, setting from Kephez Point to Chanak Kalessi; but this bay is so filled with shoals that the eddy is not of much use to vessels, except that it makes the anchorage a quieter one.

On the European side, slack water, extending 300 yards from the shore, will be found for 3 miles to the southward of Namazieh Point. The current runs along the European shore to Eski Hissarlik, and thence across the mouth of Morto Bay, running over the shoals on its western side and passing 400 yards outside Seddul Bahr.

At the bottom of Morto Bay there is a slight eddy that sometimes extends to the northward of Eski Hissarlik.

**The Narrows.**—At Chanak Kalessi the current is more rapid than in any other part of the strait, and this is the most difficult part to pass. The current extends from shore to shore, with no eddies, and is stronger at the sides than in the center. Its average velocity is about 2 knots, its maximum 4 knots. To the south and southwest of the Narrows there are eddies on either side.

**Nagara Point.**—At Nagara Point the average rate of the current is nearly 2 knots. The stream sets west-southwesterly over the end of the spit across to the European shore, to the south of Maitos, and is there deflected to the south. On the European side it follows the line of coast from Sestos Point to Bokali Kalessi. Between Bokali Kalessi and Maitos there is an eddy.

Under the lee of Nagara Point, and on the Asiatic shore, as far south as Chanak Kalessi, there is an almost continuous eddy extending some distance from the shore.

**Abydos and Sestos.**—Between Abydos and Sestos Points, where the channel narrows, the current again becomes stronger. There is occasionally a slight eddy on either shore to the eastward of these points.

**Kodjuk Burnu.**—At Kodjuk Burnu, and along the shore northward of it, the current runs strongly. Its maximum strength off the point is about  $2\frac{1}{2}$  knots. This is one of the most difficult points for a sailing vessel to pass, there being no eddy on either side.

Under the lee of Kodjuk Burnu there is, however, slack water, or an eddy sometimes very strong, but of no use for navigation to the northward of Saltik Liman Burnu, as it extends only a short distance from the shore. Between Saltik Liman Burnu and Abydos the eddy is sufficiently broad for a vessel to work to windward in.

On the European side the current runs close along the shore the whole way to Bokali Kalessi, the only exception being a slight slack in Ak Bashi Bay.

**Galata Burnu.**—At Galata Point, where the strait again narrows, the velocity of the current on the average is 1 knot, and here there is no eddy on either side of the strait.

At Karakova Point the same may be said, but there is slack water in Indji Liman on the southwestern side of that projection, but only in the bight of the bay.

**Gallipoli Strait.**—In Gallipoli Strait the current becomes stronger and varies between 1 and 2 knots. The current extends from shore to shore, but is slacker at the sides than in the middle.

In Gallipoli Bay there is an eddy, running round the bottom of the bay toward the town.

In Chardak and Lampsaki Limans the same weak eddy exists, but is by no means regular.

**Approach to Dardanelles.**—A vessel from the southwestward, bound up the Dardanelles, will first identify the entrance by the white cliffs of Cape Helles, which form the north point of the strait, and on which stands conspicuously a white stone lighthouse. On the south side are the cliffs of Sigeum, terminating at the mouth of the strait with the hill of Yeni-shehr, also steep and cliffy. Another very conspicuous distinguishing mark on the European side is Tree Peak, 730 feet above the level of the sea, 5 miles northeastward of Cape Helles. It makes as an isolated conical peak, with one large tree on its summit.

On approaching nearer, the small towns of Yeni-shehr and Seddul-Bahr will be perceived on their respective sides of the strait. The former is built on the summit of the hill of the same name, 230 feet in height. Only a few houses will be seen while the ship is still to the southward, but on bringing it to bear more to the northeast, the houses will open up, and also a remarkable row of nine windmills which stand on the north side of the town. The castle of Kum Kale will then be seen standing on a low point that stretches from the hill on Yeni-shehr to the north.

Seddul-Bahr is on the north side of the strait, and stands on the slope of the hill, forming Cape Greco, which is  $\frac{3}{4}$  mile east of Cape Helles. Here is one of the old stone fortresses, which gives its name to the town, and is a conspicuous object from its great size and the low but massive towers that rise at the angles of the castle. When these two towns can be distinguished, the entrance of the Dardanelles will be plainly open.

**Directions—Dardanelles.**—A steam vessel, or a sailing vessel with a strong fair wind, bound to the Black Sea, is recommended to keep on the European side of the strait, about 400 yards offshore, except in the narrows at Chanak, where the current is weaker in the center of the strait than at the sides.

Beyond the Narrows keep on the Asiatic side to avoid the current, and steer north to pass outside Nagara Buoy, which may be passed as close as possible, but vessels should not pass eastward of the buoy, as there is but little water and the current sets toward the spit.

After passing Nagara Buoy steer northeastward for Sestos Point, until within 600 yards of the European shore, then steer along the coast, keeping that distance outside all points, and crossing the entrances of the little bays until the Sea of Marmara is reached. Steer direct from Galata Point to Gallipoli Point to avoid the Middle Bank. On this course a steam vessel will nearly always be in the adverse current, but not in its strength, and the time lost in stemming it will be more than gained by the directness of the course.

A sailing vessel, with a foul wind, will find it is almost impossible to proceed under sail through the strait; and a master will have to choose between paying for a tug or waiting, perhaps many days, for a fair wind.

**Regulations.**—Merchant vessels arriving at the Narrows at Chanak from the Mediterranean between sunrise and sunset can pass the Dardanelles without any formalities or stoppage, except for the purpose of taking pratique for Constantinople or other ports. Masters of vessels entering the Dardanelles shall hoist their colors when passing between the forts of Kum Kale and Seddul-Bahr.

**At night**, between sunset and sunrise, vessels may proceed as far as the anchorages below the inner castles (Chanak Kalessi and Kilid Bahr) and are recommended to anchor in Sari Siglar Bay.

Sunset is indicated at the south entrance to the Dardanelles by two green lights, placed vertically, being exhibited from Seddul-Bahr, and by two red lights, placed vertically, exhibited from the northwest angle of Kum Kale.

Vessels approaching the forts Namazieh and Chanak Kalessi with the apparent intention of entering the Narrows will be warned by the successive discharge of three blank shots; and on these admonitions proving fruitless, solid shot will be fired.

After the usual warning, the regulation is peremptory to fire into any vessel disregarding it.

The Narrows begin at Forts Namazieh and Chanak Kalessi.

**Pratique.**—Regulations respecting pratique to vessels arriving in the Dardanelles from the Mediterranean are in operation.

The sanitary inquiry for vessels arriving in the Dardanelles from the Mediterranean may take place either on board or at the pratique office (Chanak) at the captain's option. Should it be desired that the inquiry may be effected on board, a flag, consisting of five red and five yellow alternate stripes horizontally, must be hoisted, and the vessel must approach the pratique office as near as possible.

The health officer before boarding will ascertain what port the vessel is from, where bound, and the sanitary conditions of the persons on board during the voyage and on arrival. If the result of the inquiry be satisfactory, pratique will be given; should it be unsatisfactory, the vessel, unless bound beyond the Ottoman ports, will be ordered to Clazomenæ (Vourlah) to perform quarantine. The sanitary inquiry for coasting vessels is made at either of the pratique offices in the straits, viz., Seddul-Bahr, Aspra Homata, Chanak, Lampsaki, or Gallipoli.

Steamers from an infected port and bound for a non-Ottoman port in the Black Sea or Sea of Azov may, if free from cholera, plague, or yellow fever, pass the Dardanelles and Bosphorus without detention. These vessels will, however, be subject to the preliminary interrogation of the health officer, and if free from infection, two health guardians will be placed on board, and the vessel can proceed in quarantine. These guardians must be landed at the Monastir-Aghzy lazaretto at Kavak.

Should there have been infectious cases on board, the vessel will be ordered back to Clazomenæ.

Vessels which pass the straits in quarantine must not stop anywhere between the Dardanelles and Kavak, and must carry a yellow flag the entire run.

Sailing vessels from an infected port may not pass through the straits in quarantine.

On arrival at Constantinople, the bill of health must be shown; and should the vessel be proceeding to the Black Sea, two firmans can then be obtained, one to pass on to the Black Sea, the other to return again through the Bosphorus and Dardanelles. Should Constantinople be her destination, one firman only is needed to pass back again through the latter strait.

Naval vessels arriving at Constantinople must send their bill of health on shore as pratique is not granted until it has been delivered.

On proceeding to the Black Sea the vessel must stop off Anatoli Kavak, near the north end of the Bosphorus, on the Asiatic side, when the pilot is landed, who will carry the firman ashore to the firman offices.

The sanitary fees are collected at Chanak.

**Return voyage.**—On return from the Black Sea, the vessel must again stop off Anatoli Kavak, between sunset and sunrise, and send on shore to obtain pratique, subject to fines for nonobservance.

At Nagara, just above Chanak, she must, under any circumstances, lie to and deliver on board the firman vessel her firman for passage, and receipts for all sanitary and light dues, which should be obtained

at Constantinople on the voyage eastward. Vessels bound outward may pass the Dardanelles at any hour if they comply with these regulations.

**Firman vessel.**—The firman vessel in the Dardanelles is a small hulk, painted black, having one mast with a yard. At night she exhibits one fixed red light over two fixed white lights placed triangularly; by day she flies the Turkish flag. She is moored in the slack water close inshore near the pier in Nagara Liman.

The firman vessel is in communication, by signal, with the castles north and south of her.



## CHAPTER III.

### SEA OF MARMARA.

**General description.**—The Sea of Marmara, united to the Black Sea by the Bosphorus and to the Grecian Archipelago by the Dardanelles, is about 110 miles in length from east to west, without reckoning the deep gulfs of Ismid and Mudania, and 40 miles in breadth in its widest part from north to south. The width at the western end for about 30 miles eastward of Gallipoli, is from 3 to 10 miles. From Gallipoli, the north shore trends to the northeast, a distance of 60 miles, and then turns to the east, 57 miles to Constantinople. The south shore trends in an easterly direction for about 110 miles, then turns toward the north and joins the north coast at the Bosphorus, thus forming a vast gulf. Its general easterly direction is broken in two places—by a projection of land to the northward between capes Tarsana and Kara, and by the Peninsula of Artaki.

The Sea of Marmara is bordered almost throughout its length by high and mountainous land; and is terminated to the eastward by two deep gulfs, of which one, that of Ismid, is 26 miles in length, and the other, that of Mudania, 17 miles. These two gulfs are separated by a high peninsula. There are two other smaller gulfs on its south coast at the Bosphorus, thus forming a vast gulf. Its general east-south of Artaki or Kapu Dagħ. They are separated by a small strip of land, over which two wooden bridges had been thrown to communicate with the shore of Asia.

The islands of the Sea of Marmara are divided into four groups. The first is perceived on leaving the Dardanelles, and lies a short distance to the northwest of Artaki Peninsula.

The most important island of this group is that of Marmara, which has given its name to this sea, and divides it into two channels of unequal breadth. The channel to the north is formed by the coast of Europe and the Island of Marmara, and is from 10 to 18 miles in breadth. The other, formed by the island of Marmara to the north and the islands of the group to the south, varies from  $2\frac{1}{2}$  to 5 miles in breadth.

The second group is called the Princes or Prinkipos Islands, and is composed of nine islands, of which the largest, Prinkipo, has given its name to the group. They lie parallel with the coast 6 miles south-east of Constantinople, and Pliny speaks of them as the Propontides.

The third is Kalolimno Island, which lies off the entrance of the Mudania Gulf and abreast of the mouth of the Moalitch River.

And lastly, the little islands of Mola, which are three in number, and lie off the eastern point of the Peninsula of Artaki.

In its eastern portion the sea of Marmara attains a considerable depth, surroundings of 650 fathoms being found 7 miles southwestward of Princes Islands, and between the Artaki Peninsula and the coast of Europe. Elsewhere depths of 30 to 40 fathoms are found 5 to 10 miles from the shore.

**Currents.**—The Sea of Marmara is so bounded by the coasts of Europe and Asia and so connected with the Black Sea and the Archipelago that these two seas have an unceasing influence on its waters.

The Black Sea, lying in the direction of the northerly winds, which blow the greater part of the year, sends through the Bosphorus its snows, fogs, and storms, and the excess of its water; while the Archipelago exercises a more favorable influence, as its numerous elevated islands break the force of southwesterly winds and reduce the strength of the current. From the fact of these two opposing influences constantly working, it is almost impossible to know what weather to expect in the Sea of Marmara, from what has been experienced in passing through the Dardanelles or Bosphorus; but a vessel going eastward can, to a certain extent, know whether she will find the currents regular and strong or not, according as to whether the winds in the Archipelago have been assisting them by blowing from the northeast, or checking them by prevailing from the opposite direction.

The currents in the Sea of Marmara are produced by the excess of water that the Black Sea almost constantly pours into it by the Bosphorus. Their general direction is, therefore, westward toward Gallipoli, but with a few slight variations, owing to its islands and to the sinuosities of its coasts.

A continuance of strong southwest winds will, however, check the currents in the Bosphorus and Dardanelles, and even occasionally reverse them. At these times everything is disorganized, and the currents in the Sea of Marmara may run in any direction.

As a rule, the stream on leaving the Bosphorus to enter the Sea of Marmara spreads out in the shape of a fan, the left branch setting toward Princes Islands, and through their channels, and thence toward the gulf of Ismid, round which it runs from west to east along the south coast, and from east to west along the north coast. Between this current and the coast of Asia, from Skutari Point to Tuzla, there is a zone of back or countercurrent, which sets toward the Bosphorus, and inside this again is a narrow strip of southerly current setting close to the shore past Bostanji as far as Mal Tepe Burnu.

The central branch takes a southerly direction toward Boz Burnu, turns eastward along the south coast of the Gulf of Mudania, and then again westward along its north coast, setting out very strong to the westward abreast Armudli village and past Boz Burnu. Lastly, the right branch take a southwest direction, but leaving between Seraglio and Stefano points a space where the current is generally weak, and even sometimes forms an eastern eddy or countercurrent.

In the channel northward of Marmara Island the current generally sets westerly, or southwesterly, and its strength is much increased in the vicinity of Hora. Here the current runs entirely along the European shore and in the center, the Asiatic side being protected by the Marmara Islands. Its maximum velocity at Hora is 1 knot. In the lesser channel to the southward of Marmara Island, the current sets northwesterly; but also pouring through Rhoda and Arablar channels between the islands to the southward, and then eastward along the north shore of the great bay of Artaki, round which it sweeps before resuming its westerly course along the south shore toward Gallipoli Strait.

The different directions which have been thus ascribed to the Marmara currents must not be taken as absolute on all occasions, but they will be found correct in ordinary weather. It has been said that an eastern eddy is to be found along the north coast of this sea. Such, indeed, may be perceived off Stefano Point when the stream through the Bosphorus first meets the southwesterly wind and swell; but no countercurrent or eddy will be found westward of that point. The general currents, however, are much weakened, and sometimes altogether checked when the wind has been blowing a long time from the southwest.

In the Sea of Marmara it is difficult to ascertain the general velocity of the current, as it is governed by so many causes. The stream from the Bosphorus very quickly loses its strength on entering the Sea of Marmara, but it always increases with a gale from the northward and northeastward, as well as during the heavy rains in winter, when the Black Sea sends into it a mass of water much larger than usual. The thaws in April, May, and June, combined with northeasterly winds, which are prevalent in that season, tend also to increase the strength of the current. This strength diminishes when violent southwesterly winds prevail. The currents are also generally weaker in calm weather, and their average velocity in the main channel must not be estimated at more than 1 knot with a fresh breeze from northeastward,  $1\frac{1}{2}$  knots with a strong gale from that quarter, and  $\frac{1}{2}$  knot in calm weather. In a gale from northeastward it has been found to set to westward 1 knot, about 8 miles southward of Erekli Peninsula.

**Winds and weather.**—What has been said of the winds, as well as almost all the observations on the weather, when describing the Dardanelles, are applicable to the Sea of Marmara. Thus north and northeasterly winds are prevalent in this sea almost all the year. In the summer they are clear and moderate and die away at sunset. In winter they are sometimes very violent and raise a short cross sea, which obliges vessels to seek shelter amongst the islands to the southward, or at Gallipoli, if they have not passed the Island of Marmara.

The weather varies much in different years in the Sea of Marmara. Winter, with its gales and occasional fine days, lasts till the end of March. In some winters southwesterly gales will prevail, with scarcely one from the northeastward. In others (the more usual case) it is the contrary, and the winter is consequently more severe. Spring is very short, leaves and vegetation appear rapidly, and summer arrives in May.

The Meltem, or summer northeasterly breeze, is not regular in its appearance, and until it does come to relieve the air, there are many hot, close days. It generally begins in the latter part of June, and should last until September. On those days when it prevails, the temperature is pleasant, but in early mornings up to 10 o'clock, before it sets in, and on days when it is superseded by the warm southwesterly wind, it is oppressively hot. During these months rain is rare.

In September will come the equinoctial rains, and perhaps a gale or two, and weather is uncertain. October is generally a beautiful month, the Meltem returns, and it is fine, with delightful temperature. November is often the same, and the fine weather may last well into December, but it often breaks up earlier with southwesterly gales and rain, and the winter is begun.

Thunderstorms are most prevalent in May, June, and July, but their continuance or frequency much depends on whether the Meltem sets in regularly or not, and on whether southwesterly winds in the Archipelago cause a conflict of currents of air, which result in these phenomena. They gather quickly and bring furious blasts with them.

In autumn and the beginning of spring south and southeast winds are frequent, especially along the northern shore. They are often fresh, but always clear, and they render the land very distinct. In all cases in the summer the Meltem causes a haze, whereas southerly winds make the atmosphere very clear. April and May are the clearest months.

In summer the wind will be very different in different parts of the sea. Generally speaking, the Meltem is much more regular in the northeastern part than in the west and south, and sometimes even a

fresh Meltem will not absolutely fetch the southern shores of the Marmara, while a few miles off it will be blowing fresh.

Along the European shore the Meltem draws much along the land. Thus at Erekli it is nearly east, and in Rodosto Bay east-southeast, while a few miles outside it is northeast. Vessels working to windward should not therefore close the European shore too much, eastward of Kodja Burnu. South and southwest winds will prevail about the Marmara Islands when the Meltem is blowing farther eastward.

During winter the barometer generally rises during northeasterly gales, sometimes as high as 30.60, and turns just before the gale slackens; at others a heavy northeasterly gale will blow for two or three days, with a constantly falling barometer. This instrument can not therefore be said to be a sure guide for these winds, but a low barometer is an invariable indication of southwesterly winds, although they may not actually fetch into the Sea of Marmara, but may only blow hard in the Archipelago and send their rain alone, east to the Dardanelles.

As this probably depends on the strength of the northeasterly winds blowing at the time in the Black Sea, it is impossible to judge in the Sea of Marmara whether the southwesterly wind will force its way in or not. The safest plan is to assume that it will, and with a threatening appearance of the sky and a low barometer be prepared. When southwesterly gales do occur, they are heavy and squally, but generally last a comparatively short time, and veer through west to northeast, from which quarter they will again blow for a couple of days.

**Sailing directions.**—The navigation of the Sea of Marmara offers but few difficulties, the weather being generally fine. A steam vessel, or sailing vessels with a fair wind, on leaving the Dardanelles, may from abreast Eski Fanar steer a course east-northeastward to clear Heraclitza Point. No vessel should try to pass within 1 mile of the shore, as the dangerous bank of Oohan Aslan, on which many vessels have struck, extends  $\frac{3}{4}$  mile from the land. It is now marked by a lightvessel, but in thick weather it would be advisable not to stand into less than 12 fathoms water in this vicinity.

By night, when Hora light is sighted, care should be taken, when it is approached within 10 miles, not to bring it eastward of  $51^{\circ}$ , as Heraclitza Point is low and dangerous.

If the wind should blow hard from northeast even a fast and powerful steamer should not hesitate to close the coast of Europe, where there would be less sea; by doing this, time would be gained and the passage shortened.

Vessels bound to Constantinople during the day generally make the land at Stefano Point, which is low and of a red color, and may be

distinguished by the houses on it, and the lighthouse to the eastward. To vessels approaching from the westward, Constantinople is hidden by Stefano Point. By not bringing Stefano Point Light to bear eastward of an  $82^{\circ}$  bearing, a vessel will not approach the land, which lies westward of Stefano Point, within 3 miles.

After passing Stefano Point, to which a berth of 1 mile should be given, steer for Seraglio Point, but take care to avoid the bank southward of it.

**Sailing vessels** when past Hora Point, instead of steering for Stefano Point should keep the northern coast on board, partly to avoid the current, but chiefly either to be in a position to work up along that coast if the wind should veer to northeastward, or to anchor, if it should come on to blow hard from that direction.

If the weather should appear threatening, with the wind northeasterly, and a vessel has not advanced farther eastward than Hora Point, do not hesitate to bear up for Gallipoli; but if as far on as Rodosto, she might anchor on the coast with north and northeast winds. If, on the other hand, the wind is more eastward, it would be preferable to keep away to the southward, and wait till the gale is over, in one of the good anchorages which will be described hereafter.

Vessels engaged in the Black Sea trade usually prefer in winter the channel southward of Marmara Island, because south and southeast winds are then more frequent, and in the case of adverse winds, they are close to good anchorages; but in the summer season, the north channel is the best. Large vessels in all seasons should keep in the north channel, and in case of bad weather they can easily run for one of the good anchorages to the southward.

**A sailing vessel with a foul wind.**—In a fair working breeze, a vessel should always keep on the coast of Europe, northward of a line leading from the north point of Marmara Island to Gallipoli Light.

**DOHAN ASLAN SHOAL** (lat.  $40^{\circ} 30' N.$ , long.  $26^{\circ} 51\frac{1}{2}' E.$ ).—A vessel must tack short here and not approach within 1 mile of the shore; but the light vessel will be a good guide.

**BOZ BANK**, off Yuriji or Boz Burnu, should not be approached within  $\frac{3}{4}$  mile; the coast in the vicinity has a steep appearance. Beyond this, the shores are free from dangers outside  $\frac{1}{2}$  mile.

**HERACLITZA BURNU** is dangerous at night, as it is low, and the hills rising at the back mislead the judgment as to distance. Hora Light can be seen over Myriophyto Point, and many vessels trusting to this have been wrecked on the point. A vessel should tack before Hora Light bears  $50^{\circ}$ .

**MYRIOPHYTO POINT** is of a similar character to Heraclitza, but does not seem so dangerous.

In turning to windward, in clear weather, between Rodosto and Stefano Point, a vessel should favor the coast of Europe, as often in fine weather the wind will be more northerly inshore, so as to enable her to make good easting, and she will also find the current there much weaker. In foggy weather, and during the night, a good lookout should be kept when approaching the land, and the lead kept constantly going. Do not shoal less than 17 fathoms water. The vessel will lose sight of Stefano Point Light when bearing eastward of  $81^{\circ}$ , and will then be approaching within 3 miles from the shore. In passing Stefano Point give it a berth of 1 mile.

In working along the shore between Stefano Point and Seraglio Point, with the wind from northeastward, there is a great advantage in standing as close in as possible on the starboard tack, not only to take advantage of the eddy current, but also because the sea is smooth. A vessel can stand well in to the edge of this bank (which 600 yards seaward has a depth of 3 fathoms), by tacking, when the trees on the conical mountain of Bulghurlu, which lies 3 miles to the eastward of Skutari, come in range with the west angle of Selimiyyeh Barracks, Skutari, bearing  $71^{\circ}$ . This restriction should continue only till abreast of the Seven Towers, when she may stand within 600 yards of the walls, as far as Seraglio Point. Here a vessel may, if desirable, anchor and await a fair wind or proceed as follows (see directions for Constantinople).

#### EUROPEAN SHORE OF THE SEA OF MARMARA.

**Dohan Aslan Burnu** (lat.  $40^{\circ} 30' N.$ , long.  $26^{\circ} 51\frac{1}{2}' E.$ ).—From Eski Fanar Burnu (Gallipoli) the coast trends in an easterly direction 9 miles to Dohan Aslan Burnu, which has yellow sloping cliffs, 95 feet high, and projects so little that, unless very close in, it does not appear as a point. On the rising ground above Dohan Aslan Point is a large white farmhouse, and farther inland, and higher, a remarkable conical mound, 66 feet in height, standing on a spur of the Megarislik Hills, at an elevation of 740 feet. This, supposed to be the tumulus of Lysimachus, is known by the Turks as Mal Tepe, and is an excellent mark for identifying the point.

**Shoal.**—Off Dohan Aslan Burnu is a bank of sand and rock called Dohan Aslan Bank, the rounded extremity of which is 1,300 yards from the shore. Here there is a depth of 3 fathoms, with 4 and 5 fathoms immediately outside; the water then deepens very gradually to 20 fathoms 3 miles distant.

The shoalest part of the bank is 1,100 yards from the shore, and has but 9 feet. Gallipoli Point, in range with the notch between Ak Yarlar (known by its white cliffs) and the next summit to the left, bearing  $246^{\circ}$ , leads clear of Dohan Aslan Bank in 8 fathoms.

There is a 3-fathom channel used by the coasters inshore, but it is obstructed by a shoal head of 10 feet.

**Light.**—A conical buoy, painted red and white in horizontal bands, surmounted by a truncated cone and exhibiting a flashing white light, 11 feet above the water, visible 8 miles, is moored on the east side of the 5-fathom shoal.

**Caution.**—As a wreck lies to seaward of this buoy, vessels in passing, should give it a good berth.

**Wreck.**—The wreck of a lightvessel, with masts showing, lies 1,800 yards  $142^{\circ}$  from Dohan Aslan Burnu.

**Buoy.**—The southern edge of Dohan Aslan Bank is marked by a red buoy in 8 fathoms, with Dohan Aslan Burnu bearing  $11^{\circ}$  1 mile.

**Bulair**, a large Turkish village on the north side of the Karaïokus Range, can not be seen from the sea. The summit of its minarets only may be discerned from a considerable distance eastward.

**Dohan Aslan Bay.**—Beyond Dohan Aslan Point the coast extends northeast, and, curving round to the east, forms a long shallow bay to Injeh Burnu, 7 miles. This bay is free from danger. Dohan Aslan Bank soon turns into the shore, and the 3-fathom line is then nowhere more than 700 yards from it. The shore is sandy, backed by low clay cliffs, similar to Dohan Aslan to the west, but soon becoming low to eastward and in some parts swampy.

At the back the hills of Megarislik drop to the eastward. On its east spur is the village of Examile, of which only a few mills are visible from the sea.

**Injeh Burnu** forms a cliff 32 feet high facing the sea, and gently rises inshore to the west end of the Halva Tepe Range, which commences here and extends along the background of the coast to the eastward, till behind the village of Heraclitza it culminates in the peak of Elia Tepe.

Off Injeh Burnu a bank of rock and sand with 4 fathoms on it extends  $\frac{3}{4}$  mile. A shoal head of 3 fathoms lies with the point bearing  $32^{\circ}$ .

**Anchorage.**—There is good anchorage 1 mile westward of Injeh Burnu, in 8 fathoms, with the point bearing  $60^{\circ}$ .

**Coast.**—Beyond Injeh Burnu the land trends  $33^{\circ}$  for 3 miles, curving round to east for 4 miles farther to Sar Kioi. This part of the coast is free from danger, and can be approached to a distance of 400 yards. The land rises from the coast sometimes as low cliffs, sometimes gradually, to the Halva Range Island. The low lands at the foot of the hills, all along this part of the coast, are subject to inundations, particularly in the summer. The village of Keziljadere is seen on this rising ground  $1\frac{1}{2}$  miles inland.

**Sar Kioi** is a large village on the seashore, standing on the low plain at the foot of Arapli Tepe. It has two mosques, three Greek



churches, and a mill eastward of the town, and contains a population of about 5,000, chiefly Greeks.

**Water.**—There is a small wooden pier abreast the center of the village, where there is a fountain of good water.

**Anchorage.**—The anchorage of Sar Kioi is not recommended; there is good holding ground, but no protection from prevailing winds. The bank that borders the shore for 300 yards falls suddenly into deep water. The best berth is in 16 fathoms, about 500 yards from shore.

**Heraclitza Burnu** (lat.  $40^{\circ} 37\frac{1}{2}'$  N., long.  $27^{\circ} 11'$  E.), 3 miles to the eastward of Sar Kioi, forms the south point of a small bay which lies eastward of it, in which is the village of the same name. The point is broad, low, and sandy, and off it the shoal bank extends 500 yards. Inshore from Heraclitza Point the country is level for about  $\frac{1}{2}$  mile, when Arapli Tepe rises abruptly.

On this hill the village of the same name is conspicuous.

To clear Heraclitza Point, Hora Light, distant  $7\frac{1}{2}$  miles, should not be brought to bear eastward of  $45^{\circ}$ . The light can be seen over the intervening land. Caution is therefore necessary, as wrecks frequently occur in this locality.

**Myriophyto**, a large thriving village,  $3\frac{1}{4}$  miles  $65^{\circ}$  of Heraclitza, is the residence of the Kaimakam of the district.

There is a point similar in character to Heraclitza Point immediately west of the village, but though shoal water extends off for some distance, it is not the scene of frequent wrecks, as is Heraclitza Point. There are some mills nearly on the extremity of Myriophyto Point, which perhaps serve as beacons.

**Elia Tepe.**—Two miles and a half from the coast, and equidistant from Myriophyto and Heraclitza, is the remarkable peak of Elia Tepe, or Sterna Tepe, 2,255 feet in height. Though not so high as the Ganos Mountains to the eastward, the shape and comparative isolation of Elia Tepe make it conspicuous.

**Anchorage.**—Off Myriophyto is the best anchorage on this part of the coast. Holding ground is very fair, and the anchorage bank, in 6 to 14 fathoms, is 800 yards wide, but the extremity of Myriophyto Point should not be brought to bear southward of  $258^{\circ}$  as the shore bank of 2 and 3 fathoms is very steep-to.

**Hora**, 4 miles northeastward of Myriophyto, is a small village standing on the sea at the mouth of Kerasia Deresi, a deep ravine rising in Elia Tepe, which is dry in its normal condition, but the heavy thunderstorms, frequent in this vicinity in summer, and heavy rains in winter convert it, in a few hours, into a roaring flood. All the ravines in this neighborhood are of this character.

**Hora (Khoraz) Light**, group flashing white, 164 feet above high water, visible 19 miles, is exhibited from a white iron tower located on the summit of South Cape.

**Anchorage.**—There is fair anchorage off Hora, in 5 to 18 fathoms, mud, and sand, with the center of the village bearing about 324°.

**Ganos**, a village 2 miles northeastward from Hora, stands higher than the other villages on the coast, being mainly built on the steep sides and top of a spur about 100 feet above the sea, and is remarkable from this circumstance. Just east, some large ravines join as they reach the coast, and, united, have brought down, when flooded, a broad belt of sand and stones, which is conspicuous from the sea on account of its barrenness.

**Coast.**—From Heraclitza to Ganos the coast, though backed by high hills (the lower spurs of which rise almost immediately from the water), is in no part cliffy, but eastward of Ganos, for 8 miles, to Kodja Burnu, high cliffs rise directly from the sea to heights varying from 200 to 900 feet, and the summits of Ganos Daghlar, nearly 3,000 feet in height, approach near to the sea. There are no villages on this part, and the coast is steep-to, with no anchorage worth mentioning.

**Kodja Burnu** is a fine bluff headland, without danger, from which the shore trends northeastward for 7½ miles to Rodosto.

One and one half miles north of Kodja Burnu, at the little village of Kum Bagha, the high cliffy coast line ceases, and the shore line is again comparatively low, with small cliffs occasionally. The country behind is well cultivated and has many villages.

There is anchorage all along this shore, but it is not good, and landing with the ordinary northeasterly winds is very difficult, especially between Panidos and Rodosto, where a rocky ledge lies about 200 yards outside the beach and is an insurmountable obstacle to a boat.

**Rodosto** (lat. 40° 58½' N., long. 27° 32' E.), named by the Turks, Tekfur Dagh, or Tekir Dagh, is a large town containing a population of about 42,000 in 1914, consisting of Turks, Armenians, Greeks, and Jews.

The town is built on the gentle slopes of a hill facing south, and looks very imposing from the bay, with a sea front of nearly 1 mile, and numerous trees interspersed among the buildings. The upper houses are 350 feet above the sea. It is, however, a dirty, ill-built, and ill-paved town, without modern conveniences, but the climate is said to be very healthful.

**Anchorage.**—Rodosto Road is a fair anchorage, but the ordinary winds from southeastward cause a tolerably heavy swell. In a very light breeze landing is difficult, and there are no piers.

The water shoals very gradually, there being 5 fathoms 800 yards from the shore. The best berth will be in about 6 fathoms, sand, with the large-domed mosque bearing north. The mill standing by itself, east of the town, makes a good mark for anchoring.

**Communication.**—There is communication with various cities by irregular steamers. There is a telegraphic communication with all parts, also daily mail by railway to Constantinople, the railway station being about four hours distant to the northward. Small steamers also ply to and from Constantinople three times a week.

**Coast.**—From Rodosto the coast trends about northeastward without sinuosities, for 10 miles, and then curves southeastward for 6 miles to Karga Burnu.

Low cliffs are the general characteristic of this part, from which the land rises very gradually to heights of about 600 feet to  $3\frac{1}{2}$  miles back from the coast.

These hills are rounded downs, either cultivated with corn, or covered with a small yellow prickly weed that can not be called grass, and are destitute of trees, except in the valleys, which are for the most part wide and fertile. There are no villages on the shore, but many ancient tumuli dotting the country.

**Anchorage.**—There is excellent anchorage off the whole of this shore; the water shoaling gradually from 20 fathoms at  $1\frac{1}{2}$  miles to 5 fathoms at 400 yards. Eastward, in the bay between Kiupriji Deresi and Karga Burnu, the 5-fathom curve is  $\frac{3}{4}$  mile from the shore.

The bottom varies between sand, shells and sand, and muddy sand inshore to mud in 15 fathoms.

**Karga Burnu**, at the eastern end of some low earthy cliffs, is a projecting spur, 55 feet high, from which foul and rocky ground stretches off for more than 200 yards, with a steep edge. A very conspicuous tumulus, called Kurtnar Tepe, rises  $1\frac{1}{4}$  miles  $33^\circ$  from Karga Burnu.

**Venedek Tash** is a rocky patch, 1 foot above water, which lies 1 mile east of Karga Burnu and 700 yards from the shore.

From Karga Burnu to Erekli, 4 miles, the shore is mainly sandy beach, backed by low steep hills. Rocky foul ground borders the coast for 400 yards, and off the south side of Erekli Peninsula, which is cliffy, a flat ledge of rock extends 80 yards.

**Erekli Bay.**—Erekli Bay, situated northward of the peninsula, is a convenient anchorage in any winds but easterly, which bring in a short, choppy sea; the bottom is mud and sand. The ordinary northeast winds of summer draw nearly due east, and come in very fresh. The remains of the ancient mole, which runs for 250 yards in a northwesterly direction from Adar Burnu, the southern point of the bay, is still of service in sheltering the inner part of the bay from the swell.

**Erekli Light**, fixed white, 164 feet above high water, visible 15 miles, is exhibited from a white iron tower located on the eastern part of Erekli Hill.

**Anchorage.**—A small vessel can anchor in  $6\frac{1}{2}$  fathoms with a large house to the north of the town bearing  $278^\circ$ , and the extreme of Adar Burnu  $129^\circ$ . For a larger ship, a berth with Adar Burnu bearing  $126^\circ$ , and the house above mentioned  $258^\circ$ , in 8 fathoms, mud, will be found convenient.

**Pier.**—The only pier, which is at the customhouse, is 55 yards in length and has a depth of 12 feet at its outer end.

**Erekli**, or Eregli, and more lately Heraclea, a small village, of no importance and with little trade, stands on the site of the ancient city, of which innumerable fragments and foundations remain, on the northern slope of a small hilly peninsula and on the south shore of Erekli Bay. The governor is a mudir only. Coming from either east or west along the shore, Erekli Hill makes as an island.

There is a telegraph station.

**Coast.**—The coast trends northeastward from Erekli for about 3 miles, and then bends away gradually eastward and southeastward to Baba Burnu, which is 26 miles nearly due east of Erekli Light-house. Off the whole of the coast in the wide bay thus formed there is fair anchorage and good landing as a rule, but the summer northeast winds, which draw very much to the east, when strong, roll enough surf on the beach westward of Silivri to make landing difficult, except in little corners under the points, and with southerly winds landing is often dangerous.

The shore is mostly low, with sandy beach, with here and there cliffy points, and in many parts it is very shallow for some distance from the land.

The ground rises very gradually from the shore, treeless, and to all appearances arid and uncultivated, but corn is grown in patches, and might be raised in large quantities. Water is to be found almost anywhere by sinking wells. Round all the villages are fine prolific vineyards, especially in the neighborhood of Boados.

The skyline from the sea, about 5 miles back on an average, is the smooth top of rounded downs 700 feet in height, though they do not look so much. Nine miles northeast of Erekli, and near Chanta village, is a somewhat conspicuous table hill, 880 feet in height, on which the two large tumuli, Kara Kioi Tepe and Chanta Tepe, show well against the skyline. Northeastward from Boados, the hills above Chatalja rise 1,030 feet above the sea, and are the highest ground in this locality. There are many ancient tumuli in the neighborhood, especially round Erekli, some of which are very conspicuous from the sea from certain directions.

**Anchorage** can be found anywhere, as mentioned above, at about half a mile from the land, in 8 to 12 fathoms; bottom sandy, with mud in depths over 10 fathoms.

**Silivri** (lat.  $41^{\circ} 4' N.$ , long.  $28^{\circ} 15' E.$ ) is a small dilapidated town, built on the site of the old city on the eastern side of Silivri Bay, nearly midway between Erekli and Baba Burnu. It is the residence of a Kaimakam, and stands well on the slopes of a hill which, immediately east of the town, presents precipitous earth cliffs, 185 feet in height, to the south, which are very conspicuous from seaward. The old walls, on the eastern side, are conspicuous on the summit of these cliffs, as is the long bridge crossing the valley westward of the town.

**Anchorage.**—The best anchorage is in 8 fathoms, mud, on a line between Kaba and Karga Burnu, the points of the bay, with the left extreme of the town bearing about northeast. Protection is afforded to caiques by the remains of an old mole.

**Boados**, Greek Epivates, is a small but somewhat thriving place on the shore,  $5\frac{1}{2}$  miles eastward of Silivri; there is a caique harbor formed by a mole.

**Triklinos Rock.**—One-fourth of a mile eastward of the village and 400 yards from the beach is Triklinos Rock, with 4 feet of water on it; the ground westward inshore of this is all rocky and foul.

**Anchorage.**—There is a good roadstead here, but care must be taken not to shoal the water under 5 fathoms, as the edge of the bank is steep. Anchor in 7 to 9 fathoms, with the tower bearing  $11^{\circ}$ .

**Baba Burnu**, 9 miles eastward of Boados, is cliffy, with the conical hill of St. Elias immediately behind, and rocks and shoal water extend over 200 yards from the point.

**Buyuk Chekmejeh Bay** (lat.  $40^{\circ} 58\frac{1}{2}' N.$ , long.  $28^{\circ} 34\frac{1}{2}' E.$ ).—Baba Burnu is the western limit of a large circular bay, named Buyuk Chekmejeh (Great Bridge), which is about  $2\frac{1}{2}$  miles long,  $2\frac{1}{4}$  miles wide, and affords excellent and safe anchorage in most seasons to vessels having good ground tackle. The entrance is open from  $168^{\circ}$  to  $225^{\circ}$ , from which quarter gales, excepting in some winters, are not frequent in the Sea of Marmara; but a considerable swell rolls in during these winds, which, though not endangering a well-found vessel, still makes the bay a rough berth. In a very heavy south-westerly gale, such as occasionally occurs, Buyuk Chekmejeh can not be considered a safe anchorage.

A reef extends nearly 800 yards from Manda Tash Burnu (or Chifut Burnu), the southeast point of the bay, to clear which keep the foot of a conspicuous peaked hill, named Azrathena (which rises within the northwest corner of the bay), in line with the western extreme of four arched bridges, which are connected, and extend from the village of Buyuk Chekmejeh. This village stands on the north-eastern shore, across the low land at the head of the bay.

The depths decrease gradually from 20 fathoms water between the headlands of the bay to 5 and 6 fathoms at its upper part, about  $\frac{1}{2}$  mile from the shore, the bottom throughout being stiff mud and good holding ground. In turning to windward, do not stand toward either shore into less than 7 fathoms water.

**Anchorage.**—The best anchorage is in 6 fathoms, with the Greek town of Kalikratia or Kalierachi, which stands on the west side of the bay, bearing  $315^{\circ}$  1,100 yards, and the southern minaret of Buyuk Chekmegeh bearing  $33^{\circ}$ . This will keep the vessel clear of a broad bank or shoal having a depth of 3 fathoms, which extends nearly 800 yards from the shore abreast of the cliffy point upon which the town of Kalikratia is built. Small knolls of ballas, having only 14 or 15 feet of water over them, rise from this bank.

**Water.**—There is a fountain of good water on the beach at Kalikratia, which runs all the year round and is sufficient for the requirements of several vessels; and for the convenience of loading boats, three slight wooden piers extend from the town into  $4\frac{1}{2}$  feet water.

**Lagoon.**—Westward of the village of Buyuk Chekmegeh is the channel, which communicates with a large but shallow lagoon to the northward. The road from Constantinople to Rodosto crosses this channel by the four bridges of ancient date, mentioned above; under the bridges there is 2 feet of water.

The lagoon is 4 miles in length in a northwesterly direction, and from 1 mile to  $\frac{1}{2}$  mile in width, with nowhere more than 5 feet of water. The northern end is lost in reeds and swamps, through which pass the Kara Su and Kug Dere, two small streams which flow down the broad Chatalja Valley. North of the bridges the entrance is closed by a fish weir, a gate in which affords entrance to caiques.

The outer line of the defenses of Constantinople, which crown the heights on the eastern side of the Chatalja Valley, terminate at the eastern side of this lagoon.

The railway from Constantinople to Adrianople passes  $1\frac{1}{2}$  miles to the northward of the lagoon, but there is no station nearer than Chatalja, 4 miles farther northwest.

**Coast.**—From Manda Tash Burnu to Ambarli village,  $5\frac{1}{2}$  miles, the coast is cliffy, and fringed by shoal water and foul ground for 400 yards from the shore. There are several rocks nearly awash about 200 yards from the beach, and vessels should be cautious in approaching this shore, as the water shoals rapidly.

To the eastward of Deirmen Burnu are some white marl cliffs that are very conspicuous.

**Kuchuk Chekmegeh Bay** (lat.  $40^{\circ} 58' N.$ , long.  $28^{\circ} 46' E.$ ) is 8 miles eastward of Manda Tash Burnu. The bay affords no protection except during northeasterly winds, but the lagoon, which is larger than that of Buyuk Chekmegeh, is deep, and, doubtless, at one

time was a valuable port. The entrance is now reduced to a narrow stream, up which a gig may be dragged with difficulty. The southern portion of the lagoon, which is over  $1\frac{1}{2}$  miles square, has a large area of 6 to 10 fathoms water. The northern portion, 3 miles in length, is narrower and not so deep.

Kuchuk Chekmejeah village, which stands at the southeast corner of the lagoon, is very small.

The railway skirts the eastern shore and crosses at the head of the lagoon; 1 mile southward of the village, and on the shore, is the Chekmejeah Floria Station.

**Landmark.**—The Russian military monument, which stands about  $\frac{1}{2}$  mile from the shore to the eastward of the village, is a conspicuous mark from seaward.

**Anchorage.**—There is fair anchorage in Kuchuk Chekmejeah Bay. A berth in 12 fathoms, with the Floria Station bearing  $45^\circ$ , is about the best. There is no landing in southerly winds.

**Stefano Point**, 3 miles southeast of Kuchuk Chekmejeah, and 7 miles from the entrance of the Bosphorus, is a red cliff 50 feet in height. The village of San Stefano, mostly composed of brightly colored houses, stands on the western part of the cliff.

**San Stefano** is the most distant of the suburbs of Constantinople to the westward, connected by a daily service of rail and steamers.

**Stefano Point Light**, fixed and flashing white, 75 feet above high water, visible 14 miles, is exhibited from white stone tower located about  $\frac{1}{2}$  mile east of San Stefano.

**Stefano Shoal.**—Vessels bound to the Bosphorus generally close the land about San Stefano Point, and, in their anxiety to keep out of the current setting out of the Bosphorus, which, however, does not pass within 3 miles of Stefano Point, not infrequently hug the shore so much as to ground on the sandbank which extends  $\frac{1}{2}$  mile south-eastward of Stefano Lighthouse. From the outer edge, where there is 5 fathoms, this bank shoals gradually to the shore. The 3-fathom line is 700 yards from the point.

**Buoy.**—A red buoy is moored 700 yards from the edge of the shoal, with Stefano Point Lighthouse bearing N.N.W.  $\frac{1}{2}$  W., distant about 1,400 yards. It is not to be relied on.

**Clearing mark.**—The western tower of the Selimiyyeh Barracks (a huge yellowish building, with a tower at each angle, standing on the Skutari shore), in line with the northern and highest summit of Chamlija Hill, or Mount Bulghurlu,  $68^\circ$ , will clear Stefano and Seraglio Points Shoals in  $5\frac{1}{2}$  fathoms.

**Makri Kioi.**—The coast forms a bay eastward of Stefano Point, and on the eastern side of this, and 2 miles  $67^\circ$  from the lighthouse, is Makri Kioi, a growing suburb of Stambul. Close to Makri Kioi, on the west, are the Government powder mills of Zeitunlik, and 1

mile eastward is the gun foundry of Demir Khan, with its immense chimney, a conspicuous object on nearing the Bosphorus.

**Marmara Tower.**—Four miles 67° of San Stefano, the southwestern angle of Stambul is reached, where the old sea and land walls of Constantinople join at the Marmara Tower, a square building on the seashore. Immediately behind are the variously shaped towers of the old castle, known as Yedi Kule, or Seven Towers. The sea walls to Seraglio Point are 3 miles in length.

Eastward of Stefano Shoal, as far as the Marmara Tower, the shore bank extends off for 500 yards, diminishing its distance up to Seraglio Point, where it again stretches seaward for 600 yards.

**Anchorage.**—From Stefano Point to Seraglio Point there is good anchorage in 7 to 13 fathoms. Off Makri Kioi, and the western part of this anchorage, the deeper water is the better holding ground; near Seraglio Point, and under the eastern part of the south walls of the city, where sailing vessels usually anchor while awaiting a fair wind to enter the Bosphorus, deep water, and a mud bottom, will be found close to the shore.

All this anchorage is exposed during southerly or westerly winds, but as it is generally used only as a temporary stopping place, it does not matter so much, every vessel taking advantage of the first breath of south wind to move into the Bosphorus. No loading or unloading takes place on the south shores of Stambul, except from the local caiques that bring wood or provisions from the shores of the Sea of Marmara.

**Seraglio Point** (lat. 41° 0' N., long. 28° 59' E.) is surrounded by a mud bank which deepens gradually, from 3 feet to 5 fathoms, about 400 yards, to the southward, and forms a rounded extremity; the bank thence gradually approaches the shore northward, which it skirts as far as Old Seraglio Point. A vessel, in order to pass round Seraglio Point in 5½ fathoms, should keep the highest peak of Mount Bulghurlu in range with the western tower of Skutari Barracks, 68°, till the great summer palace of Dolma Bagche is well open to the eastward of the walls of the Old Seraglio.

There is a good anchorage near the southwest edge of the bank which surrounds Seraglio Point, but in order to be sheltered from the strength of the current, which sets along its eastern side, a vessel should anchor with Leander Tower in line with the point of the Old Seraglio, and never open that tower eastward of it, as the current would make it difficult to weigh from a berth outside of that bearing.

#### ASIATIC SHORE.

From Fanous Hill, described in the previous chapter, the Asiatic shore of the Sea of Marmara is low. The small river Bairam Dere, draining the valley of the same name, falls into the sea 600 yards



eastward of the hill. Farther on, the hills, on the east side of the Bairam Dere, approach the sea, and show cliffs of about 220 feet in height; the highest part of these, at the east end, in line with the summit of Codja Flamur Hill,  $136^{\circ}$ , is the clearing mark for Zindjir Bozan Banks. Beyond the cliffs the coast, alternately low or cliffy, continues its easterly direction for 5 miles to Cape Yuriji or Boz; the hills, rising higher and higher in the interior, are moderately wooded.

Several shoals, of 14 to 16 feet, rock and sand, lie off this part of the coast about 600 yards from the shore, with deep water inside them.

**Cape Yuriji or Boz Burnu** (lat.  $40^{\circ} 24\frac{1}{2}'$  N., long.  $26^{\circ} 55'$  E.) is a triple point, about 70 feet in height. A shoal of 18 feet, about 400 yards in extent, in a northeasterly and southwesterly direction, named Boz Bank, lies nearly 1 mile  $292^{\circ}$  from the point. The summit of Ak Yarlar Dag, on the Gallipoli Peninsula, just open northward of the old lighthouse tower on Fanous Hill, bearing  $268^{\circ}$  leads northward of this shoal and of the others that lie to the westward.

**Yuriji Bay.**—Eastward of Cape Boz the coast trends southeast for  $2\frac{1}{2}$  miles, then east for  $3\frac{1}{2}$  miles, thence north-northeast 2 miles to Kamir or Kamaris, and forms a large bay named Yuriji. Immediately beyond Boz Burnu the shore is straight, flat, and sandy, the hills standing a little distance from the coast, but at the east end of this sandy shore the hills are close to the coast and present precipitous cliffs of varied heights, diversified by little sandy coves. From the sea, wooded hills appear to rise one over the other with pleasing variety, the valleys are cultivated and rich in flocks and herds, and this character of coast is maintained to Kamaris.

There are no dangers in Yuriji Bay, the coast being generally steep-to, with the exception of a few rocky islets lying near the shore in some places. There is no good anchorage in the bay, the prevailing northeasterly wind blowing directly on the coast, while the holding ground is bad.

**Village.**—The large village of Yuriji is situated  $1\frac{3}{4}$  miles from the coast, in a fertile valley. Its produce is brought down to one of the little sandy bays above mentioned, named Keresli Iskalessi. A large quantity of charcoal is shipped from here.

**Kamir or Kamaris Liman.**—At the northern extremity of Yuriji Bay is Kamir Liman, a sandy bay about 1 mile across, formed by the curving of the coast line to the north-northwest, and terminating in Cape Tarsana. Kamir Liman affords protection from northeast winds.

**Kamir Chai.**—The Kamir River empties itself in the center of Kamir Liman. In the winter, the flat land round its mouth is generally under water, but in summer exhalations from this plain cause much malaria and sickness in the town. The river, which drains the

large plains of Kamir Ovasi, is of considerable depth and width for many miles, and never ceases flowing; in summer a dry bar forms across its mouth, through which the water filters to the sea.

**The town** (lat.  $40^{\circ} 25' N.$ , long.  $27^{\circ} 4' E.$ ), named Kamir by the Turks and Kamaris by the Greeks, situated on the shore of the bay, is a collection of miserable houses on the right bank of the river, under a high cliff that stands a short distance back from the coast. Kamir contains a population of about 3,000, and possesses one mosque, situated on the beach. The part of the bay to the north of the town is still called the Arsenal, though no trace exists of any buildings. Fine Hellenic walls of white marble may be traced for a great distance, probably the ruins of the encircling walls of the old town. A theater can also be seen on the hillside facing the northeast, below the mill on the point. Heaps of stones, fragments of Roman walls, and underground passages abound in the valley to the east of the present town. Half a mile up the Kamir Valley two arches span it. The ruins of Parium may be seen on the other side of the hill behind the town.

**Communication.**—Kamir has telegraphic communication with all parts.

**Water** can be obtained from a fountain in the town, but it is not considered good.

**Anchorage.**—Good anchorage may be found in Kamir Liman 500 yards from the shore, in 12 fathoms, mud, with the extremity of Tarsana Burnu bearing north and Kamir Minaret  $140^{\circ}$ . The anchorage is well protected by the land northward and eastward, but is open to westerly winds.

From the point under the conspicuous mill to the left of the town the remains of an old mole runs out under water, which must be avoided.

**Tarsana Burnu** (lat.  $40^{\circ} 25\frac{1}{2}' N.$ , long.  $27^{\circ} 4' E.$ ), a white rocky point, 25 feet high, extending to the northwest, forms the termination of Kamir Liman. The coast line beyond trends southeast for  $\frac{1}{2}$  mile, and then turning northeast, continues generally in the latter direction for nearly 2 miles, forming several sandy bays, with rocky points and cliffs between.

**Tuzli Islet** situated 2 miles northeastward of Tarsana Burnu, and 500 yards from the nearest part of the shore, is 125 feet high, and composed entirely of white marble. The islet is steep-to and there are 7 and 8 fathoms between it and the shore.

**Yumurta Islet.**—Eastward of Tuzli Islet the coast forms a shallow bay to another point 1 mile distant. Off this point lies Yumurta Islet, 120 feet high, and, like Tuzli, formed of marble, but its appearance is not so white as the latter. Yumurta is connected with the

land by a submarine ridge, having just enough water for a boat to pass over. A ridge of 5 fathoms extends 400 yards north of the islet.

**Anchorage.**—A vessel can anchor between Tuzli and Yumurta Islets, close to the latter in 13 fathoms, opposite a small valley in which two mills in Deirmenjik are visible. In this berth Aksas Burnu will appear just to the southward of Yumurta Islet. The anchorage affords protection from east winds.

**Coast.**—Beyond Yumurta, the coast extends east,  $1\frac{1}{2}$  miles, to Aksas Burnu, forming a shallow bay between, broken up into sandy beaches and cliffy points. Between Tarsana and Aksas points it is free from danger, and deep water will be found 400 yards from the shore, the 5-fathom ridge north of Yumurta Islet excepted.

**Shah Melik Liman.**—From Aksas Burnu, a cliffy bold headland, the coast trends southeastward, for  $2\frac{1}{2}$  miles, to a small bay called Shah Melik Liman, where anchorage in about 13 fathoms can be found and protected landing, but the northeast wind brings a good deal of swell into the anchorage. Behind Shah Melik Liman the country is hilly and uncultivated, with a good deal of brushwood cover.

**Aksas village.**—The little village of Aksas, inhabited by Greeks, stands on the sandy beach to the westward of Shah Melik Liman.

**Kara Burnu** (lat.  $40^{\circ} 28\frac{1}{2}'$  N., long.  $27^{\circ} 17\frac{1}{2}'$  E.) is a fine headland, 6 miles eastward of Aksas Burnu. A few rocks above water, that lie 100 yards northeast of the point, are steep-to; the cape is otherwise clean. Between Kara Burnu and Shah Melik Liman the shore is cliffy and steep.

**Kale Burnu** is  $4\frac{1}{2}$  miles  $157^{\circ}$  from Kara Burnu, the coast between being high and cliffy. It is 50 feet in height, and is the sharp termination of the promontory forming Karabuga Bay. Excepting some rocks awash, 50 yards from the shore, the point is clean.

**Karabuga Bay.**—From Kale Burnu the coast runs back westward for  $1\frac{1}{2}$  miles, and then turning south and southeast forms Karabuga Bay.

West of the peninsula, which is edged by a low cliff, the shores of the bay are nearly all sandy beach. Chal Tepe, a rounded hill with a double summit, stands about 660 yards from the beach on the western side, leaving a narrow strip of flat ground between the foot and the sea, and forming the northern boundary of the great plain of Biga Shehir, down which flows the Biga Shehir Chai.

Running from sea to sea, across the root of the peninsula, are the decaying remains of some fine Byzantine walls, the ruined towers on which are very conspicuous from the sea. Low walls can also be traced round the whole peninsula, and the remains of an ancient mole, forming a galley port, are nearly awash off the middle of its southern shore.

produce in the northern valleys. Villages are scattered round the shore of the peninsula, Erdek or Artaki, situated on the southwest point, being the chief town.

Of the two great bays formed on either side of the isthmus, the western one, Artaki Bay, is the most useful as an anchorage, as the northeasterly winds blow home strong into Peramo Bay, the eastern one, at all seasons.

The north side of the peninsula, although steep, is nowhere so steep-to as to prevent a ship from anchoring, if drifted in during a calm, and numerous sandy bays afford good holding ground in ordinary breezes.

**Artaki Bay** (lat. 40° 22' N., long. 27° 49' E.), on the western side of the isthmus, connecting the peninsula to the mainland, is 3 miles across at the entrance from Topchu Burnu to Murad Bair, and 4 miles from east to west.

It is a capacious anchorage and, excepting in southwesterly winds, smooth in all weathers. Holding ground is very good everywhere, especially in the deeper water at the northwest portion. Southwesterly winter gales are ordinarily rare, but when they do occur they are heavy. They give, however, ample warning by a fall of the barometer and threatening appearance of the sky to the southward.

Southwest of Murad Bair, and separated by a navigable channel  $\frac{1}{2}$  mile wide, is the rocky and desert island of Towshan Ada.

By anchoring to southeastward of Murad Bair, communication is easy with Artaki town; but for a single ship the anchorage off the town itself is preferable for this purpose.

The land on both sides of Artaki Bay is high. On the southern shore the hills rise at once from the beach, but on the peninsula there is a stretch of flat land, between the foot of the mountains and the bay, which is well cultivated with vines and olives.

The ancient Cyzicus stood on the flatland and ends on the spurs adjoining the isthmus. Though once very large, and richly adorned with marble and stone temples and public edifices, but little now remains. All the larger blocks of marble have been from time to time carried off to aid in building Constantinople, and the fragments of smaller size have been collected into thick walls, which divide from one another the fields and vineyards with which the site of the old town is completely covered. There are, however, considerable portions of the amphitheater left standing which was built across a valley 1 mile from the sea. Parts of the walls that faced the isthmus also remain.

The isthmus is mostly swampy on its western side, and on the eastern side are low, bare sand hills.

**Aidinjik**, a large Turkish village, about 1,350 yards back from the south shore, is picturesquely placed on a dip between the hills, which

divide the seacoast from the elevated plain of the Maniyas Lake, and with its minarets is very conspicuous from Artaki Bay.

**Murad Bair (St. Simeon Hill)**, on the point forming the northwest termination of Artaki Bay, is very conspicuous in approaching from west or north, being 340 feet in height and cone shaped. It has a curious crust of marble, overlying other rock, and was in former days fortified. The remains of heavy walls and towers still exist on the northeastern or land side.

**Towshan Ada (Baonusa)**, a small, rocky, and arid island, 150 feet in height, is steep-to on all sides.

**Simeon Channel**, separating Towshan Ada from Murad Bair, is nearly  $\frac{1}{2}$  mile in width, with from 10 to 17 fathoms of water, except in one spot, nearly on the line joining the summits of Murad Bair and Towshan Ada, and 300 yards distant from the shore of the former, where there is a rocky patch of  $3\frac{1}{2}$  fathoms. In passing through this channel, a vessel must therefore hug the island side, which is quite steep-to and clear.

**Erdek or Artaki** is a considerable place, with a population of 4,000 to 6,000. There are several mosques with tall and conspicuous minarets. It stands at the northern point of a small sandy bay, just to the northward of Murad Bair, and occupies the site of the old Greek town of Artace. The Kaimakam of the peninsula lives here.

**Communication.**—A steam vessel runs here from Constantinople once a week, and a telegraph line connects Artaki with Constantinople via Panderma.

**Zeitin Ada**, a small rocky island, lying 270 yards from the shore, at Artaki town, is covered with old foundations, and has the remains of an old mole extending from its northern point. From the mainland point the relics of another mole stretch out for 120 yards toward Zeitin Ada. Between these two is a channel 150 yards wide with 2 fathoms of water, used by native craft.

**Three-fathom Rock.**—Five hundred yards southwest of Zeitin Ada is a small rocky patch of 3 fathoms, with deep water around it.

**Anchorage.**—There is a good anchorage in the bay between Zeitin Ada and Murad Bair, both of which are steep-to. Anchor in 10 fathoms, with the south point of Zeitin Ada bearing N. W.  $\frac{1}{2}$  W. and a tall chimney in the center of the bay  $84^{\circ}$ .

**Coast.**—From Artaki the coast trends to the northwest for 7 miles to Mutha Point. To Korakhia Point, 3 miles from Artaki, it is low and sandy, an extensive plain intervening between it and the foot of the hills; but Korakhia Point itself is steep and cliffy, being the termination of a rounded hill called Panar Tepe and from here to Rhoda, mountains rise directly from the sea.

There is good holding ground, in 16 to 20 fathoms, 1 mile offshore, between Artaki and Korakhia Point.

**Gonia Bay**, from the shore of which rise the steep sides of Mount Klapsi, 2,530 feet high, is on the north side of Panar Tepe. It has a considerable area of anchorage ground in from 8 to 17 fathoms, but in northeasterly winds, heavy squalls come down the ravines occasionally, even when there is but a moderate breeze on the north side of the peninsula. The village is very small, with a little flat land around it.

**Rhoda Channel** between the western part of Artaki Peninsula and the Island of Pasha Liman, affords access to Artaki Bay from the north. It is a little over 1 mile wide at its narrowest part, and free from all dangers with the exception of a sand shoal that runs off from Mutha Point for 400 yards.

There is anchorage everywhere in the channel, which is nowhere deeper than 20 fathoms.

**Mutha Point**, on which Rhoda village stands, is a low sandy spit, difficult to see at night. Off it, as before mentioned, stretches a shoal with 5 fathoms 400 yards. Excellent water, brought down from the mountains, can be obtained from a mill at Rhoda.

There is fair anchorage south of Rhoda village, in about 16 fathoms water, but by far the best anchorage is 1 mile to the north in Palios Bay.

**Palios Bay** has excellent holding ground and is well protected from the northeast. The best spot for anchoring is midway between Palios and Glaromiti Points, in 12 fathoms.

**Palios (Palaio) Point Light**, two fixed red, 131 feet above high water, visible 6 miles, is exhibited from a mast on a white house located on the west point of Artaki Peninsula.

**Harakhi Point**, also bold and high, is the northwest point of Artaki Peninsula, and  $\frac{1}{2}$  mile north of the lighthouse on Palios Point. A rocky shoal extends to the westward 200 yards.

From here the coast trends northeastward 2 miles and is bordered by rocks and shoal ground.

**Likos Rock**, 400 yards from the shore, 1 mile northeast of Harakhi Point, has only 4 feet of water on it, and does not generally show. There is shoal water 200 yards outside the rock. When turning to windward, by tacking before the summit of the peninsula of Hukhlia, in Pasha Liman Island, disappears over Harakhi Point, a vessel will be clear of the rock.

**Halko** is a small island, 120 feet high, lying 600 yards from the Artaki shore and  $1\frac{1}{4}$  miles from Harakhi Point. There are several rocks around it, but all are above water. The channel inside Halko is obstructed by patches of 2 fathoms.

**Favlimi Bay** is too open to the northeast to be of much use as an anchorage. Its eastern side is shoal.

**Drakontas Bay**,  $1\frac{1}{2}$  miles east of Halko and separated from Favlimi Bay by a narrow mountain spur, is the best anchorage on the north side of the peninsula. It is a square bay,  $\frac{1}{2}$  mile long by a little less wide, and is open to the north; the eastern shore, however, curves round so as to give protection against northeasterly winds to a vessel anchoring in 13 fathoms, mud, with the eastern extreme of the bay  $14^\circ$  and the few houses in the southeast corner of the bay bearing  $118^\circ$ . Drakontas village lies up the valley, the lower part of which is well cultivated.

**Vathi Bay**, 2 miles east of Drakontas, is a rectangular-shaped inlet,  $\frac{3}{4}$  mile in each direction and open to the northeastward. The village, which is small, is in the southwest part of the bay.

Its shores are steep, with no dangers, and the spurs that form its sides dip precipitously to the sea. Inside the line of the points there is good holding ground, anywhere in 10 to 20 fathoms, but the best berth is toward the southeast corner, in 14 fathoms, muddy sand, with the eastern point of the bay bearing  $33^\circ$ , the chapel on a spur north of the village,  $258^\circ$ , and the western point of the bay,  $331^\circ$ , but with a northeasterly wind of any strength there will be some sea here, and, despite its superior size, Vathi is not such a good anchorage as Drakontas.

From the sandy beach at the head of the bay a fertile valley, nearly flat, runs back  $\frac{3}{4}$  mile, but is surrounded by abrupt spurs of the mountains.

**Coast.**—From Vathi Bay the coast, which is very picturesque, the mountains being of good shape and well clothed with trees and bushes, trends generally  $101^\circ$  for 11 miles, cliffy and steep, with the mountain spurs rising abruptly from the water. There are many small sandy bays, but none of sufficient depth to give any protection to a large vessel; in the eastern corners boats can land and caiques obtain shelter. A ship can anchor nearly anywhere in 12 to 20 fathoms between 250 yards and  $\frac{1}{4}$  mile from the shore, bottom varying between mud, sand, and gravel; the deeper water the better holding ground.

**Kapsala Burnu** (lat.  $40^\circ 29' N.$ , long.  $28^\circ 2' E.$ ), the eastern point of the Artaki Peninsula, is cliffy and has a rocky ledge running off northeastward 400 yards.

**Coast.**—From Kapsala Burnu the shore trends south-southwestward for  $1\frac{1}{2}$  miles to Moda Burnu, and then turns southwest by west into Peramo Bay.

**Pasha Liman Group** consists of four islands, lying west of Artaki Peninsula. The surfaces of all of them are very broken, and their shores rocky, except in the bays, which have sandy beaches.

Pasha Liman, the largest and easternmost, possesses an excellent harbor and is well cultivated with vines. The other islands are only cultivated in the vicinity of their little villages and are otherwise covered with grass or scanty bush.

Kutali Road, between Kutali and Arablar Islands, is a good anchorage in northerly winds and much frequented during the winter by sailing vessels, waiting for a change, to get eastward.

**Pasha Liman** is separated from Artaki Peninsula by the Rhoda Channel. Its shape is irregular, and the southeastern portion, where the village of Hukhlia is located, forms a peninsula, only connected to the main island by a narrow and low isthmus. The length of the island is, from northwest to southeast, 5 miles and its breadth  $3\frac{1}{2}$  miles. The surface is very varied; the hills are mostly rounded, and at the northern extremity the symmetrically conical hill of Mount Elias, 700 feet high, is very conspicuous from all sides; it is also the highest point of the group. On the Alichí Isthmus are some disused salt pans.

There are several small islands lying off the shores of Pasha Liman, of which Kuyus Adasi, the largest, forms, with a deep indentation into the main island, the secure port of Pasha Liman Harbor, and anchorage is to be had in any of the bays in the island, but they are all open from some direction, and holding ground is not good.

There are five villages on Pasha Liman, all small and miserable. In Pasha Liman, on the eastern shore of the harbor, there are a few Turks, and this is the residence of the Mudir, the governor of the group; the other villages are all exclusively Greek. Wine is the principal production, and the larger part of the island is covered with vines.

Excepting a few olives, there is not a tree on the island. The gray partridge is to be found in considerable numbers.

A steamer from Constantinople is supposed to call at Pasha Liman once a week, on her way to Artaki, but during the winter the island is sometimes weeks without any communication with the metropolis.

**Pasha Liman Harbor** is secure from all winds and has sufficient room for a squadron, the anchorage ground being  $1\frac{1}{2}$  miles long by  $\frac{1}{2}$  mile wide, with moderate and fairly uniform depth and a good holding mud bottom. Entrance is easy from the north and not difficult, with a fair wind, from the west.

With a southwesterly gale a little swell will come in through the west pass, which will affect vessels in that line, but not to any great extent.

**Cape Kukumar** (lat.  $40^{\circ} 31' N.$ , long.  $27^{\circ} 36' E.$ ), the northwest point of Pasha Liman, is a bold headland to look at, but has a rocky ledge running off it to southwestward for over 300 yards.



From this southward the bank on the eastern side of the harbor is narrow, and follows the shore up to the town, where it turns across and fills up all the  $\frac{1}{2}$  mile at the bottom of the bay.

**Glaromiti Point** is low, and has shoal water extending from it for over 400 yards.

**Middle Ground** is a shoal patch, 300 yards in length, with only 9 feet on it. It lies on the line between Glaromiti Point and Pasha Liman village,  $\frac{1}{2}$  mile from the former, and though it partly spoils the harbor, it protects vessels lying in the southern part of it from the swell which enters during a southwesterly gale. It does not show, and must be carefully avoided in picking up a berth.

**Fairway Patch**, a small rocky patch, with 18 feet water on it, in the west pass, midway between Glaromiti Point and South Centre Island, greatly spoils that entrance, being situated in the middle of the channel and generally not visible. Vessels must pass southward of the bank; the leading mark is given hereafter, but is not easily made out.

**Kuyus Adasi**, which forms the northwestern side of Pasha Liman Harbor, is a narrow rocky island covered with grass. It is 2 miles in length north and south, including the Islet of Mamalia, which lies to the north, and is only separated by a shallow opening a few yards wide. The rounded hillocks which crown its ridge rise to 415 feet at the north end and 295 feet at the south. The latter hill is covered with large white erratic boulders, looking like a flock of sheep.

There is a narrow rocky ledge all round the island, which widens off the southern end into a very shallow bank, extending nearly 600 yards to the south into the west pass, and 800 yards to the east into the harbor; it is steep on all sides, and can generally be seen, but has patches of only 6 feet in many places.

**Centre Islands** are two small flat-topped islets, standing on the eastern edge of the last-mentioned bank. The southern and largest, 50 feet high, is useful as a leading mark on entering the harbor from the north.

**Directions.**—**North Pass** is clear of danger, with the exception of the rocky ledge extending from Cape Kukumar Pasha Liman Island.

To enter by this channel, bring the west peak of Pasha Liman, a well-defined hill, 380 feet in height, in range with the eastern edge of South Centre Island bearing  $190^{\circ}$ . This will lead in mid-channel, and when Cape Kukumar bears  $81^{\circ}$  steer  $177^{\circ}$  for the windmill, standing on the beach, just west of Alonyi village, and anchor as convenient.

**West Pass** is narrow and encumbered with banks, but a depth of 7 fathoms can be carried in by attention to the marks. In using this entrance, bring the northern hill house in Pasha Liman village in

range with a ruined mill, on the ridge behind the town, bearing 85°. This will lead midway between Fairway Patch and the shoal water extending from Glaromiti Point, and when the North Centre Island is open clear, to the east of the south one, steer as convenient for an anchorage.

In consequence of the construction of several houses to the north of Pasha Liman village, the leading mark for West Pass has become difficult to distinguish.

**Panagia**, a small island, 115 feet high, with a smooth grassy top, lying 800 yards to the westward of the southwest point of Pasha Liman, is surrounded by a shallow bank, in most directions, for about 300 yards, but its western or seaward point is steep-to. A shoal bank also connects it with a small islet (30 feet high) which lies 600 yards from the south point.

The channel between Panagia and Argero Point, nearly 600 yards wide, is navigable. Shoal water extends about 150 yards from the points on either side, but it is otherwise clear and steep.

**Arablar Channel**, between Arablar and Pasha Liman Islands, is 1 mile wide at its narrowest part, and perfectly clear. At the north end the points are steep-to, but off the southwestern point of Kuyus Adasi and off Yalipliman Point in Arablar, the 5-fathom line extends 400 yards.

**Arablar (Afisia) Island** is about the same size as Pasha Liman. Its surface is very broken, hills craggy and bare, and cultivation only exists in a few of the valleys and near the Turkish village of Arablar, on the east coast, and Afisia, the Greek village, on the west coast, both poor, but the latter is the better of the two.

There is no harbor in Arablar Island, and, though protection may be found from northeast winds off Afisia, a better, and in many respects handier, anchorage will be obtained in Kutali Road.

**Shoals.**—The shores of Arablar are generally rocky, with foul and shoal ground extending 100 to 300 yards, but on the northern side this stretches farther.

Off a small point on the north coast, midway between Voli Point and Marmara Point, the shallow water extends 375 yards to the northeast, with a small islet 15 feet high on it, and farther to the northeast, 800 yards from the shore, is a rocky patch, with only 24 feet water, surrounded by depths of 9 fathoms.

Between Voli Point and Afisia village, the 3-fathom bank stretches a long way to the northwest.

**Roun Rock**, a small rocky islet, 20 feet high, in the southern part of the channel between Arablar and Kutali, is connected to the Arablar shore by a 9-fathom bank, which stretches off from the low sandy point, north of Afisia village, on which there is a conspicuous mill. It is situated 1 mile from the shore of Arablar and 1½ miles to

the northward of Pandjar Point, and is surrounded by a rocky shoal, which extends 400 yards northeast and 100 yards northwest, or on the passage side.

Seven hundred yards to the northeast is a rocky patch of 24 feet, but as this lies in the direction of the north point of Arablar it is no obstruction to navigation.

**Kutali Road Light**, fixed white, 49 feet above high water, visible 12 miles, is exhibited from a white iron tower over a house located on Roun Rock off Arablar Island in Kutalia Road.

**Ekinik (Kutali)** is a small and narrow island lying  $\frac{1}{2}$  mile northwestward of Arablar. It is 2 miles long by 800 yards wide, and the shores are all rocky or cliffy. St. Elias Hill, with rounded sides and a flat summit, rises to 500 feet on the western side of the island, the center and eastern portion of it being much lower. The town stands in the center of the southern side of the island, and formerly possessed a good deal of small shipping, plying in the Marmara and neighboring seas, but its trade has now much decreased.

**Water.**—There is a good fountain of water, but being on the north side of the island it is all but inaccessible to boats.

**Kutali Channel**, between Arablar and Kutali Islands, is not available for vessels of over 23 feet draft of water, as a bank of 24 feet connects the two islands. The channel is, moreover, considerably narrowed by banks of 3 fathoms, which extend from both shores, and from the eastern point of Kutali, but is much used by sailing vessels trading to Constantinople in the winter, as they generally take this route when going eastward, especially with a westerly wind. Starting from the Dardanelles in the morning, a large number of these vessels frequently anchor in Kutali Road in the evening, either to await daylight for their further advance or when fearing a change in the direction of the wind.

On the Kutali side, the shallow bank stretches 300 yards south of Kalolimionos Point, and is here, and up to Kutali village, exceedingly steep. One-fourth of a mile eastward of the point it runs within 100 yards of the shore, and then again increases its distance, till  $157^{\circ}$  of the village it forms a narrow horn projecting  $\frac{1}{2}$  mile. Eastward again of this it maintains a width of about 400 yards, which is also the distance to which a rocky ledge called Hudro Plaka extends southeastward of St. Triada, the eastern point of Kutali. The current makes a very distinct ripple on the Hudro Plaka Ledge.

On the Arablar side of the channel, off Voli Point, the 3-fathom edge extends only 100 yards from the shore. From here it trends westerly for  $\frac{1}{2}$  mile, where it is 800 yards from the Arablar shore; it then turns sharply to the south, and runs into the coast at the low sandy point north of Afisia.

No leading mark can be given for passing through Kutali Channel, but a course in mid-channel, steering  $70^{\circ}$ , will take a vessel of 23 feet draft clear of danger, if attention be paid to keep well in the center.

The current runs about west, and will edge a vessel over toward the Kutali side; but unless going very slowly, it will hardly be felt in the short distance.

**Rocky Patch**, 1 mile southeastward from Kalolimionos Point, is a rocky patch, about 300 yards in diameter, with 24 feet on it.

**Kutali Road** is a good anchorage in northeast winds and much frequented in the winter by sailing vessels. The anchorage, in 6 to 10 fathoms, sandy mud, is situated south of the village, and westward of the 3-fathom horn before mentioned.

The best berth is in 8 fathoms, with the west end of the village bearing  $348^{\circ}$ , and a red-roofed mill on the point immediately east of the town, in line with a hill 170 feet high on the north point of Kutali, bearing  $45^{\circ}$ . There is a little swell here in strong northeasterly winds but nothing to affect a ship with good ground tackle. In southwesterly gales Kutali Road affords no protection, and should be avoided. In this case a vessel should run for Pasha Liman.

**Khairsiz Ada, or Ayansha**, is a barren rock of a gray color, 330 feet high and about 1,200 yards in length, lying westward of the northwest point of Marmara Island, from which it is separated by a channel  $1\frac{1}{2}$  miles in breadth, with 35 to 45 fathoms of water.

**Marmara Island**, Mermer Adasi of the Turks, is the principal island of the sea to which it gives its name. It is 10 miles in length from east to west,  $5\frac{1}{2}$  miles in breadth, and lies 40 miles  $78^{\circ}$  from Gallipoli Lighthouse, 20 miles southward of Rodosto, and 5 miles northwest of Artaki Peninsula.

The island is mountainous throughout. The summits of the double chain of hills, which extend more or less from east to west, are frequently seen from Gallipoli, and serve as a mark for vessels navigating to or from the westward. It is divided into two distinct geological portions, the northern half from Galimi Village to Beyaz Burnu being all of white marble, with scarcely any soil on it. The hills are angular, the valleys abrupt, and, excepting at the bottom of the latter, there is no vegetation or cultivation. The southern half of the island is of a slaty rock, with occasional patches of granite, and the valleys and lower slopes are well cultivated and fertile. The mountains of this portion, which are higher than the northern, are craggy, but have good downs amongst their summits. Psili Dagh, the highest peak, is a long ridge, which shows as a peak only from a northeast or southwest direction. It is 2,320 feet high.

The celebrated marble quarries in the northeastern part of the island, which have been worked in all historic times, and of which the ornamental buildings of all towns on the Marmara have been built,

are still worked, but on a very small scale compared with the works of former years. The débris from the quarries have formed on the shores of Mermerjik Bay a steep white slope, very conspicuous from the northward.

**Villages.**—There are six small villages in Marmara, all on the coast. The shores of the island are steep and free from danger, with the exception of the Laza Rock in Klazati Bay. The water off the north and west shores is very deep.

**Anchorage.**—On the south side vessels can anchor in any of the small bays, but heavy squalls, which vary considerably in their direction, come off the land, and the anchorage bank is narrow and generally steep. The best anchorage, on the south shore, is off St. George's Monastery, in the eastern part of Klazati Bay, in about 15 fathoms, with the monastery bearing  $33^{\circ}$ .

**Marmara channels.**—Marmara Island divides the sea of Marmara into two channels. The northern, between the island and the European shore, is 10 miles wide and free from danger, and used by nearly all vessels bound to the Bosphorus during the finer season of the year.

The southern channel, known as Marmara Channel, between Marmara Island and the Pasha Liman group, 3 miles wide at its narrowest part, and nearly as clear as the northern one, is much used in the winter by vessels going eastward, starting with fair winds, as southerly winds are believed to be more frequent on that shore. There are also good anchorages handy in case of bad weather, but the westerly going current runs much stronger south of Marmara than to the north, and with northeast winds the wider north channel is to be preferred.

**Dangers.**—The shores are everywhere steep-to, with the following exceptions: The 4-fathom patch, lying 900 yards off the middle point on the north side of Arablar, and which is only a danger to vessels of heavy draft; and the Laza Rock off Klazati Bay in Marmara.

The southern channel is by no means a bad route when going from Constantinople to the Dardanelles, in clear weather, as by adopting it the stream of steamers coming in the opposite direction through the north channel is avoided. The light on Fanar Adasi is a good guide for entering the channel, and the south points of Marmara are bold and easily seen at night.

**Marmara village** is on the site of the ancient town, of which no remains exist. The anchorage is not good, and the foregoing remarks with regard to squalls refer especially to this bay, which is backed by high and abrupt mountains. There is good water to be had in the town, but in a dry summer the supply is scarce.

**Laza Rock**, situated 800 yards  $168^{\circ}$  from the eastern point of Klazati Bay, is very small and surrounded by deep water. It has 9 feet

on it, but never shows, and there is 28 fathoms between it and the shore. It is only a danger to vessels hugging the shore, or running for an anchorage in Klazati Bay. The south part of Kutali Island kept open of Venetico Point  $254^{\circ}$  will lead south of the Laza Rock.

**Palatia Bay** is an inlet on the northeast part of the island in the neighborhood of the quarries. The northeast wind blows home, but there is protection in the eastern part in 6 fathoms, with the left extreme of the point to the northward, bearing  $22^{\circ}$ , and the northern end of the long sandy beach  $98^{\circ}$ . The village is poor, intensely hot in summer, and water is scarce, but there is a good well at Ay Ioanni Monastery, a little way inland.

**Mermerjik Bay**, an inlet immediately east of Palatia, is entirely open to the northeast. There was formerly a village in the eastern corner, but the quarries are now so little worked that it has been long deserted.

**Nisi Island**, with its surrounding rocks and islets, is cliffy and sterile, and has a boat channel between it and the main.

**Fanar Adasi**, a marble islet lying 1,200 yards east of Beyaz Burnu, the eastern point of Marmara, is 100 feet high and steep to on all sides, except on the west, where shoal water with some rocks awash extend for nearly 400 yards.

**Marmara Island Light**, alternating fixed and flashing with a red flash, 134 feet above high water, visible 15 miles, is exhibited from a white quadrangular stone tower located off the east point on Fanar Adasi Islet.

**Mola Islands**, three in number, lie off Kapsala Burnu, the eastern point of Artaki Peninsula, from which Ay Andrea, the nearest, is  $1\frac{1}{4}$  miles southeastward. The islands are all rocky and have outlying rocks in several directions. Ay Andrea, the largest, is 200 feet high and nearly  $\frac{3}{4}$  mile in its extreme length. Ay Georgios and Mexa are about  $\frac{1}{4}$  the size of the other, and are, respectively, 150 and 110 feet high.

**Agria Petra** is a sunken rock awash, lying  $\frac{3}{4}$  mile  $137^{\circ}$  from Mexa. It seldom shows, and is separated from Mexa by a 15-fathom channel 1 mile wide.

**Anchorage.**—There is capital anchorage under the Molas in northeast winds, in about 14 fathoms with the left extreme of Ay Andrea bearing  $334^{\circ}$ , and the right extreme of Mexa  $98^{\circ}$ . The bottom is mud with coralline lying on its surface, which alone the lead will bring up.

An 8-fathom bank, which extends off the southwest point of Mola, is not so good, being mostly of sand.

**Peramo Bay**, the eastern gulf formed by the peninsula of Artaki, is 7 miles long and  $3\frac{1}{2}$  miles wide. It is fully exposed to the north-

east winds, from which there is no protection, excepting in two small anchorages on the Artaki side.

**Villages.**—On the peninsula are the villages of Muhania, near the eastern point, Peramo, which gives the bay its name, 2 miles farther west, and Ermeni Kioi, 2 miles east of the isthmus. These are all thriving little places. The first has a small mole to protect caiques, and at Peramo the shape of the bay also affords good shelter. Yeni Kioi, at the peninsula side of the isthmus, is a mere hamlet.

The town of Panderma and the small villages of Mamun and Dut Liman are situated on the south shore of Peramo Bay, which is mostly steep-to.

**Anchorage.**—Kum Liman, halfway between the villages of Peramo and Ermeni Kioi, has a considerable area of anchorage ground, in 11 to 18 fathoms, mud, and the point of Velar Burnu affords a little protection in northeast winds, but they draw too far east to prevent all swell from coming in. There is a good stream in St. Athanasius Valley, the western valley of Kum Liman.

There is a better anchorage in the bay east of Ermeni Kioi, into which the swell does not fetch so much, in 14 fathoms, with the point immediately eastward of it and Kalin Burnu in line, and a small cliffy point in the bay bearing north.

**Panderma** (lat.  $40^{\circ} 21\frac{1}{2}'$  N., long.  $27^{\circ} 58\frac{1}{2}'$  E.), a large town with a mixed population of 17,000, stands on the slope of the hill facing the west, in a small bay in the southernmost part of Peramo Bay. The exports are wool, cotton, opium, valonia, sheep, cattle, and cereals to Constantinople, and a certain amount of boracite ore from some mines on the upper Moalitch; and the imports consist of calico, woolen and linen goods, iron, copper, steel, tin, coffee, and sugar. The town is advantageously placed, as the land at the back of Panderma Bay is the lowest in the neighborhood;  $\frac{3}{4}$  mile inland it rises to 260 feet and then slopes almost imperceptibly to the shores of Lake Maniyas, 6 miles inland. West of this dip rise the bare rounded hills of Deleki Bair, 1,150 feet high, and to the eastward the spurs slope steadily up to the higher mountains of Kara Dag.

A few English steamers and some Greek vessels of small size call every year for cargo for Europe, and steamers ply between Constantinople and Panderma daily. There is also telegraphic communication with Constantinople, Brusa, Artaki, and the Dardanelles, telegrams being sent in any European language.

**Anchorage.**—There is good anchorage off the town, in about 11 fathoms, but in strong northeast winds a heavy sea fetches in. A small mole protects small craft only. The breakwater is destroyed, the head which is under water being marked by a post.

Two quays, 1,000 and 500 feet long, respectively, and a jetty 600 feet long with a depth of 8 fathoms at its end, are being constructed, as well as three smaller jetties.

**Supplies.**—About 1,000 tons of coal was imported annually, 100 tons being usually kept in stock, but is not for sale. Liquid fuel could be obtained. Fresh provisions could be purchased; also good water.

**Maniyas Geul**, a large sheet of water, 10 miles long from east to west, with a breadth of 7 miles, stands on an extensive plain, which also contains Abuliona Geul, and is bounded on the north by the hilly country bordering the Sea of Marmara and on the south by high mountains far inland. Eastward the plain extends to the slopes of Olympus. There are many small villages and farms in this plain, which is, however, mainly under grass and supports a large quantity of cattle. The Maniyas Lake, which abounds with fish and is the resort of thousands of waterfowl in the winter, has for its outlet the river called the Kara Su, which falls into the Moalitch a little below Moalitch town, and would probably be navigable for boats of light draft were it cleared of trees and snags.

**Coast.**—Eastward of Panderma the coast line trends eastward for 24 miles to the mouth of the Moalitch. To within 6 miles of the river the shore is rocky and for the most part precipitous, the land rising rapidly to Kara Dagh, 2,730 feet high, the summit of the wooded range which backs all this piece of coast.

At a small village called Yeni Kioi, 6 miles west of the Moalitch, the hills retire from the sea  $1\frac{1}{2}$  miles, leaving a perfectly flat plain between them and the low sandy shore, which is for the most part inundated in winter.

The villages on this coast are small and wretched. A quantity of firewood is cut for use at Constantinople.

**Anchorage.**—There is no protection, even for caiques, except off the small village of Dut Liman, built on a low promontory 4 miles east of Panderma, where the natural configuration of the land is aided by a small mole, and the holding ground is good; but vessels can anchor anywhere on this coast from  $\frac{1}{4}$  to  $\frac{1}{2}$  mile from the shore, in from 10 to 20 fathoms. Holding ground varies, but is generally good mud; off Kurshunlu village especially, the mud is very stiff, and from here eastward, the anchorage ground widens considerably.

**Moalitch or Susurlu Chai** (lat.  $40^{\circ} 24' N.$ , long.  $28^{\circ} 31' E.$ ) flows through the center of a broad plain, and falls into the sea 7 miles south of Kalolimno Island, which has probably been pushed out by the river itself, and now projects 2 miles northward of the hills, through which the river finds its way, making a low rounded point in the coast line. The narrow pass in the hills, through which the river runs, is open when bearing  $202^{\circ}$ , and plainly visible from sea-



ward. The plain extends 4 miles on either side of the river. On it are large lagoons and swamps, which swarm with wild fowl in the winter.

The mouth of the river at the extremity of the point (Sazkaveh Burnu) is about 200 yards wide, and may be distinguished by a coffee house (the only house on the shore for miles), which stands on the western side of the entrance.

**Bar.**—The position of the bar varies, and the depth of water on it ranges from 3 to 7 feet. A man from the coffee house waves a flag in a manner which, to the initiated, conveys information as to the deepest channel, but without knowing the meaning of his signs, they are not of much assistance. When there is much water in the river, and consequently a strong current running out, a very slight wind from the north raises a roll on the bar, which is dangerous to deeply laden boats.

Ascending the river to Vavara, 5 miles, a depth of 6 feet will be found in all seasons, but in summer shallows extend across from bank to bank, which prevent all but very small boats passing, and here caïques load and unload. From October to May, when the river is full, craft drawing 5 feet can pass up to the town of Moalitch, 13 miles in a straight line from the entrance, or to Lake Apollonia.

The Apollonia River, which flows from the lake, joins the Moalitch proper 10 miles from the coast, and is deeper and larger than the main river:

The Kara Su, which drains Lake Maniyas, joins the Moalitch 2½ miles above the other junction. The river is obstructed by snags and fallen trees, but could probably be made navigable if required.

At Moalitch town, a large place standing on a low hill in the plain south of the coast ranges, there is a shallow part of the river, where once stood a mill dam.

**Anchorage.**—There is good holding ground on the extensive mud flat, which is formed by and extends off the Moalitch for 2 miles. A berth in 7 fathoms, with the coffee house bearing 236°, will be found convenient, as from there the river is open, and boats can be watched crossing the bar.

A good deal of swell comes in with a northeasterly wind, but vessels have ridden out a fresh gale without moving their anchors, and it was found that the thick river water lessened the sea considerably.

**Abuliona (Apollonia Lake)**, about 13 miles from east to west and about 6 miles in breadth, is shallow, having nowhere more than 2½ fathoms as far as sounded, and its southwestern shores are edged with thick reeds to such an extent that it is impossible to determine where the true shore lies. The area submerged varies greatly with the season in this portion, but the north and southeastern shores are permanent. The lake is fed by the Adirnas Chai, which empties

through the reedy swamps in the southwest portion, and the town of Apollonia is on a peninsula toward its eastern end.

To the west of the lake stretches the wide plain through which the Moalitch runs and which also includes Lake Maniyas. The north is undulating ground, rising gradually from the lake, while to the south and east, high hills, spurs of Olympus, come more or less close to the borders of the lake.

**Kalolimno (Imrali Island)** lies 7 miles to the north of the Moalitch River, and 10 miles to the westward of Boz Burnu, on an extensive bank of soundings, which affords good anchorage ground on all sides of the island. It is  $3\frac{1}{2}$  miles in length from north to south and  $1\frac{1}{2}$  in breadth at the widest part. The surface of the island is much broken, the highest peak, a sharp conical one, 690 feet high, being at the northern extremity, which is of a hammer-head shape, and thereby affords protection in northerly winds to the bays on either side of the island. It is inhabited entirely by Greeks, and generally goes by its Romaic name of Kalolimno.

Its shores teem with fish, but being situated to leeward of Constantinople, both as regards the prevailing wind and the current, prevents any trade in such a perishable article. A considerable portion of the island is cultivated, prominence being given to the production of onions. Enough wine for the use of the populace is made from grapes grown on the slopes above the town, which is a small and dirty place, built on the north shore of the eastern bay, and bears the same name as the island.

**East Bank.**—Off the eastern side of the island a sand and coral bank with from 16 to 20 fathoms water on it, stretches  $6\frac{1}{2}$  miles southeast.

**Anchorage.**—East Bay is the best anchorage in ordinary summer weather when the northeasterly winds, though fresh, are not sufficiently strong to be feared; but in the heavy gales of winter the western bay is preferable. Milos Point, on which are three mills, bearing  $40^\circ$ , and the eastern extremity of the town  $348^\circ$ , is a good berth in 10 fathoms, sand and mud, with fair holding ground, 400 yards distant from the town.

The native caiques lie close to the town, inside a small breakwater.

**West Bay** has the disadvantage of being open to the westward, but is a very good place in northerly and northeasterly winds. The bottom is sand only, but it holds well. With a heavy northeasterly gale and sea, the anchorage here will be quiet, and the wind seldom shifts from that quarter to the westward.

The western extreme of the island bearing  $11^\circ$ , and a small house in the bight of the bay  $112^\circ$ , is a good position, in 7 fathoms, but a small vessel can go farther in with advantage.

**West Bank.**—The bank of shoal water on the west side of the island also extends a considerable distance from the land, the 10-fathom line being as much as  $2\frac{1}{2}$  miles from the shore of West Bay.

**Dangers.**—At a distance of 2 miles west-northwest from Agios Elias Point are some 9-fathom patches of sand and coral.

**Lena Reef.**—From Lena Point, the low southern extreme of the island, a narrow spit of sand and coral with patches of less than 6 feet water extends  $213^{\circ}$  2 miles, where the depth falls suddenly from 2 to 20 fathoms. This reef is nearly always visible, and the current frequently races over and round it, creating overfalls, which help to mark its position.

**Coast—Eskel Liman** (lat.  $40^{\circ}$  22' N., long.  $28^{\circ}$  40' E.).—From the Moalitch the shore trends east-southeastward for 7 miles to Eskel Liman, a small bay, where a vessel can anchor in fine weather and where there is good landing at a small breakwater at all times.

From Utgu Burnu, the eastern point of Eskel Liman, the coast becomes cliffy and steep, the spurs and ridges from the high land of Kuzghunjuk Bair stretching to the very shore. The shore line trends in a general easterly direction, for 10 miles to Mudania, diversified by a few insignificant bays and the villages of Trilia and Sii. Off this coast there is no anchorage.

**Injir Liman (Gulf of Mudania)** is a broad and open gulf, formed by the lofty peninsula of Boz, projecting to the westward 17 miles from Gemlik, which is situated at the head of the gulf.

The water is deep throughout, and in the whole of its 40 miles of coastline there are but two fair anchorages—one close to the south-eastward of Boz Burnu, the other at Gemlik—for though Mudania is used as the port of Brusa, and has most of the trade, the anchorage is very inconvenient, not to say unsafe, and the same may be said of the other spots where there is room to drop the anchor. A short but heavy swell gets up with any fresh wind, and heavy squalls come off the mountains from all directions. If running for shelter in a northerly gale, the anchorage under Boz Burnu, off Armudli, will be found convenient and safe and much less out of the way than Gemlik.

The gulf is surrounded by mountains on all sides, mostly bare or covered with stunted brushwood, but the higher peaks, such as those in the center of the Boz Peninsula and the lofty Kieulu Dag to the eastward of the gulf, are well clad with pine forests. The Mysian Olympus, named by the Turks Keshish Dag, with its long and generally snowclad ridge, 8,190 feet above the sea, and at the foot of which stands Brusa, is conspicuous in the south.

There are numerous small villages on or near the shore. The valleys round the gulf are very beautiful and fertile, and are for the most part cultivated, mulberry trees predominating.

In the mountains of the Boz Peninsula are bears and deer, but they are not easily found.

**Arnaut Burnu** (lat.  $40^{\circ} 23' N.$ , long.  $28^{\circ} 52' E.$ ), the point west of Mudania, is a conical headed eminence, 370 feet in height, which shows well on approaching from the westward. A road which winds round, and halfway to the summit, serves also to distinguish it.

**Mudania**, on the south shore of the gulf, is 10 miles south-south-eastward from Boz Burnu. It is built on a flat shore, backed immediately by well-cultivated hills, and the vicinity is populous, Mudania itself having a population of about 4,000 or 5,000.

From here a well-kept macadamized road leads to Brusa, 14 miles; there is also a railway. The road ascends for the first 5 miles, where it crosses the hills 1,000 feet above the sea. It then dips to the broad Brusa plain, about 200 feet above the sea, and crossing the Ulfer Chai rises again gently to Brusa 600 feet.

The port of Mudania is entirely open and loading is performed by lighters, which in bad weather is impossible. There is a pier belonging to the railway company. The depth of water alongside is about 22 feet. A rocky shoal situated about 100 yards northwest of the wooden railway pier at Mudania is marked by a small red buoy moored outside it.

**Communication.**—Steamers run between Constantinople and Mudania three times a week in summer and twice a week in winter. One train runs daily each way over the railway between Mudania and Brusa. There are also numerous carriages and vehicles of all descriptions to convey travelers and goods to the capital of the Province. There is a telegraph office.

**Anchorage** is indifferent, the bank of soundings being narrow. A vessel must drop her anchor in 20 fathoms to have room to veer, and, as heavy squalls sometimes come suddenly from northwestward, a good lookout must constantly be kept. The water shoals quickly from 15 fathoms, the best berth being in 20 fathoms, mud, about 500 yards from the shore to the eastward of the town, with the railway pier bearing  $258^{\circ}$  distant about 400 yards. Westward the bank is narrower, and therefore not so convenient for anchoring.

**Brusa** (lat.  $40^{\circ} 12' N.$ , long.  $29^{\circ} 4' E.$ ), the chief city of northern Asia Minor, lies at the northern foot of Keshish Dagħ (Olympus), and is 14 miles in direct line south-southeastward of Mudania and 15 miles south-southwestward of Gemlik. It is celebrated for its beautiful situation and its silken fabrics, and contains a population of about 76,000 of mixed nationalities, the majority being Turkish. It stretches about 2 miles from east to west, has about 150 mosques, large and small, and is built in the usual irregular way common to Turkish towns, with narrow and dirty streets. The supply of water

is abundant and excellent. It stands about 600 to 800 feet above the sea, with the steep sides of Olympus rising immediately behind, and commands an extensive view to the north across the plain of Brusa (which in the vicinity of the town is well cultivated and dotted with trees), to the fine mountains around, and to the east of the Gulf of Mudania. The summit of Olympus, 6 miles southeast, is not visible from Brusa.

**Communication.**—A railway connects Brusa with Mudania; by road it is a four hours' drive. From Gemlik the journey occupies five hours, but carriages are rarely obtainable at the latter place unless ordered from Brusa. There is also telegraphic communication.

**Keshish Dag.**—The summit of Keshish Dag, or Mysian Olympus, a long bare ridge, stretching west-northwestward and east-southeastward, with small peaks of nearly equal height, rises 8,000 feet above the sea, the highest peak being the third from the western end of the ridge and 8,190 feet high. There is snow in the gullies all the year round, hardly discernible at a distance during the summer months.

**Coast.**—From Mudania to Tuzla Burnu, 10 miles eastward, the coast curves into a bay, but the water is too deep for convenient anchorage, though in the bight of Kavakli Liman, east of Kurshunlu village, the same kind of berth as at Mudania may be found. Behind Altintas and Kurshunlu rises the craggy mountain of Filar Dag, 1,940 feet high.

**Tuzla Burnu** is low and sandy, with salines and marshes behind.

**Gemlik**, at the head of the gulf on the north side of the bay, is a thriving town having a population of about 5,000, and has a more modern and clean-looking appearance than any other town on the shores of the Sea of Marmara.

The hills around are thickly planted with olives, and the valley, which extends back for a short distance eastward, is well cultivated.

The pass through the mountains eastward, down which flows the rapid but shallow outlet of the İsnik Lake, affords communication with the rich country around the lake, and a certain amount of trade is carried on from that direction, chromium, amongst other things, being brought down to Gemlik for shipment; but the commerce of Brusa nearly all goes to Mudania, as, though there is also a macadamized road between Brusa and Gemlik, the gradients are steeper, it is slightly longer, and not kept in as good repair as the more frequented route to Mudania.

On the south side of Gemlik Bay are the remains of the naval yard, now deserted, westward of which fish traps extend for about 150 yards from the shore. There is also a wooden mole, but in a bad condition; about  $\frac{1}{4}$  mile south of this mole there is a silk factory and several buildings, which afford a good landmark.

Five hundred yards back from the beach, to the southeast, are some hot springs, over which baths have been built.

**Communication.**—Steamers from Constantinople call twice a week. Carriages for Brusa are obtainable at a day's notice. There is a telegraph station.

**Anchorage.**—The most sheltered position is in the southeast corner of the bay, and a very good berth will be found in 15 fathoms, with the bridge over the hot springs stream  $118^{\circ}$ , and the minaret at the southeast corner of the town  $42^{\circ}$ . A small vessel can lie closer in to the southeastward with advantage. Though westerly winds blow home here, there is little sea, and the holding ground is good.

There is a pier, with 12 feet of water alongside it, situated at the south end of the town.

**Coast.**—From Gemlik the shore trends northwestward 5 miles to Karajali. A little west of Kumli Iskalessi, which is to be known by a white house standing near a small pier, is a narrow bank of precarious anchorage.

Yassi Burnu, 8 miles  $281^{\circ}$  from Gemlik, is a headland similar to Arnaut Burnu, near Mudania.

From Yassi Burnu to the point of Boz Burnu is  $9\frac{1}{2}$  miles, the shore being steep-to until abreast of Armudli village, with the exception of a small 5-fathom bank, with thick mud on it, situated 200 yards from the shore, about 400 yards to the westward of Fistikli Valley.

**Armudli Anchorage.**—A little eastward of the southern angle of Boz Burnu, and opposite the village of Armudli, is very good anchorage in northerly winds. The lead will only bring up a small branched coralline, but underlying the surface is stiff mud, in which the anchor will get a good grip. The best position is east of a 5-fathom bank that extends off Meykhane Burnu, in about 13 fathoms, with the left extreme of Boz Burnu bearing  $298^{\circ}$ , and the rounded summit of Moskov Tepe  $348^{\circ}$ .

**Boz Burnu**, a bold headland with cliffs, is steep-to, and can be rounded within  $\frac{1}{4}$  mile.

A bank stretches off the northwest point for about 700 yards, where from 9 fathoms it drops quickly to 20 fathoms.

**Coast.**—The north shore of the Boz Peninsula from Boz Burnu to Deve Boyunu Burnu, 19 miles, is bold and steep-to. The mountain ranges extend their spurs directly to the beach, and there is no safe anchorage. A vessel can bring up, however, on a narrow bank off the village of Ay Kiriaki, in southerly winds, but could not remain with a strong breeze from the north, and the same may be said of the bay to the west of Deve Boyunu Burnu.

**Katirli** is a village, inhabited by Albanians, about 1 mile southwest of Kalem Burnu. Three miles southeast, and on the summit of

Beylik Karlik Dagh, frozen snow is collected, which supplies the metropolis during the year.

**Deve Boyunu Burnu**, from its quoinlike shape and steep cliffs, 100 feet in height, facing the north, shows prominently from the east or west.

One mile eastward, off the village of Kuru Kioi, is another temporary anchorage.

**Coast.**—From Deve Boyunu Burnu to Chatal Burnu, 11 miles east, the coast changes in character, the higher hills retire into the background, and the sandy beach is only backed by low spurs.

**Yalova**, the principal village in this locality, consists of about 50 houses, and is equidistant between the two points. There is a stone pier at the village, 140 yards long, with a depth of 9 feet alongside, and there is also a very snug little port 1 mile westward, formed by a breakwater protecting the mouth of the Samanli Dere, and into which caïques can run in nearly all weather, over the little bar, on which is 4 feet of water, though it breaks with a fresh breeze. This breakwater, at the extremity of which is a white stone beacon, is a private enterprise, and caïques are charged a small sum for its use.

There is a telegraph station at Yalova, and a regular service of steamers connects it with Prinkopo and Constantinople.

**Anchorage.**—The best anchorage on this shore is just eastward of the breakwater, in 19 fathoms, mud, with the beacon bearing  $146^{\circ}$ ; holding ground good and plenty of room. There is also good anchorage, in 13 fathoms, stiff mud, off the village, about 350 yards from the pierhead.

**Chatal Burnu**, a low, rounded, sandy point, is the commencement of the Gulf of Ismid. There is no bank off its extremity. There are a few conspicuous chifliks (farmhouses) on the shore between Chatal Burnu and Yalova.

**Landing places.**—On the north shore of the Boz Peninsula there are small breakwaters, forming landing places for boats, at the following spots: Hum Burnu, Pasha Iskalessi, on the western side of Deve Boyunu Burnu,  $\frac{1}{2}$  mile west of Kuru Kioi, and the mouth of the Samanli Dere. Landing can generally be effected at Ay Kiriaki.

**Topography.**—The Boz Peninsula is a mass of lofty mountains, intersected by numerous and picturesque valleys and passes. The culminating point on the peninsula is Tash Dagh, 2,970 feet high, but Yel Dagh, 5 miles northeastward of Gemlik, and therefore not strictly on it, is 3,140 feet in height. The main passes from the north side to the south all converge toward Yalova, and are Samanli Dere, which leads by a pass 800 feet above the sea to the Kumli Valley; Darli Dere, up which is a path leading to Gemlik over a mountain ridge 2,600

feet high; and Balaban Dere, up which a causewayed road carries the main traffic to the large villages of Chengiler, Bazar Kioi and Yeni Kioi, situated on the northern side of the Isnik Lake.

There are some hot baths in Hamam Dere, a subsidiary valley of Samanli Dere, which were formerly of great repute. They are romantically situated, near a remarkable sharp peak, called Sivriji.

**Gulf of Ismid.**—This most beautiful arm of the sea, 27 miles in length, from Chatal Burnu to Ismid, is a deep cut through the mountains, in an east and west direction. Its shores are in general very steep, and convenient anchorage is only to be found at certain places. The width of the gulf varies from 1 to 5 miles, and it is divided into three bays by the approach of the shores to one another in two places. The eastern one of these forms a very good harbor, with convenient depths throughout.

The borders of the gulf are extremely picturesque, and present an alternation of tree-clad mountain, valley, and plain, which, as seen from the sea, is seldom surpassed, especially in the spring, when the blossom of the numerous orchards relieve the more somber colors of the forests crowning the higher ridges. Villages are numerous, and around them the ground is usually well cultivated, but much rich land lies waste.

Very heavy squalls come down the valleys, especially with southerly winds, and in thunderstorms, prevalent in some years, the puffs are sudden and violent. A short choppy sea gets up with strong westerly winds which sometimes blow completely home to the head of the gulf, making boat work unpleasant even at Ismid.

Fever is exceedingly prevalent after May, until the break up of the weather, late in autumn, and at Ismid itself, which is very unhealthy, the residents seem to be liable to it at all times of the year.

**Coast.**—From Chatal Burnu to Dilburnu, 6 miles, the coast forms a bay called Topche Bay. There the coast hills begin to rise again and assume a steeper face to the sea, but a little flat ground intervenes between it and their foot.

A little to the eastward of Chatal Burnu, the Chukur Kioi Deresi falls into the sea. This river flows down a broad and fertile valley between the Kabakli and Chukur Ranges, and at times is a considerable stream. Seams of indifferent coal are found up this valley.

**Topche Bay Anchorage** (lat.  $40^{\circ} 41\frac{1}{2}'$  N., long.  $29^{\circ} 26'$  E.).—In the bight of Topche Bay is a large area of good anchorage, 600 to 1,400 yards from the shore, in 5 to 20 fathoms, mud. The best position is off a boat landing place (Topche Iskalessi), but should the wind come strong from northwestward there is more protection to be found at Kavak Iskalessi, eastward of Dil Burnu.

**Dil Burnu** projects far into the gulf and is very low. A small hill stands 1 mile to the south of the point, which at a distance ap-



pears as an island. West of this hill lies the village of Hersek, from which travelers by land take a fresh departure for Brusa or other places in the interior after crossing the gulf from Dil Iskalessi on the northern shore.

**Dil Burnu Shoal.**—Dil Burnu is bordered by an extensive shoal bank of mud and sand,  $\frac{1}{2}$  mile wide on the western side; and stretching 600 yards north of the point; it is steep-to, and should be approached with caution. The sand bank, which forms, as it were, the core of this shoal north of the point, varies much in height and length, according to the strength and direction of the previous winds, being sometimes above water, at others awash. The extremity of the shoal is not visible to the eye. The discoloration off the point is due to the wash of the currents, and does not coincide with the limits of the bank. In rounding the point give it a berth of  $\frac{1}{2}$  mile. Two miles west-southwest of the point, and 800 yards from the shore, are some 9-foot patches, on the edge of the bank.

Two and one-half miles southwest of the point is the mouth of the Yalak Dere, which, when full, discharges a considerable quantity of muddy water into the sea and discolors it far beyond the extent of the shoal water.

**Gulf of Ismid Light**, fixed green, 40 feet above high water, visible 8 miles, is exhibited from a mast on a white house located on Dil Burnu, south entrance point.

**Coast.**—From Dil Burnu the coast turns sharply to south-southeastward 4 miles to Kavak Iskalessi. Off all this coast there is good anchorage, but the shore is still skirted by the shoal bank, over 800 yards. A large lagoon, full of fish, opens to the sea  $1\frac{1}{2}$  miles from Dil Burnu, and the entrance is trapped.

**Anchorage.**—Kavak Iskalessi is the best anchorage in the western portion of the Gulf of Ismid, the holding ground being very good, with sufficient room and fair protection. With a northeasterly wind, a short chopping sea will get up, but landing can generally be effected at the little piers. The position is marked by two small houses, off which vessels anchor in 11 to 15 fathoms.

**Coast.**—From Kavak Iskalessi the coast takes a general direction of  $78^\circ$  for 12 miles to Geulzuk Burnu, with only minor sinuosities and no good anchorage in the whole distance, although a vessel may anchor in 20 fathoms nearly anywhere and have room to swing, but the squalls off the hills render it desirable to have more space than is generally available.

**Karamusal** is the largest village along this shore and is the residence of the Kaimakam.

The vicinity of Karamusal produces quantities of fruit, but not of a very superior quality. Cherries are ripe in May and are followed by

plums, peaches, apricots, walnuts, apples, and pears. A fishery has been established. There is a telegraph station here.

The hills approach closely to the water on this side, rising, range after range, to a height of 3,700 feet, and the valleys among them are very pretty.

**Geulzuk Burnu** is a low sandy spit, and with **Zeitin Burnu**, 1 mile, on the opposite side, forms the entrance to the eastern bay of the Gulf. Shoal water extends about 150 yards off it. There is a lagoon behind the point.

**Coast.**—From **Geulzuk Burnu** the coast takes a general direction of  $101^{\circ}$ , with several large bights, and there is good anchorage everywhere. It is all low, and the hills recede from the shore again after **Geulzuk Burnu** is passed.

At **Bash Iskalessi**, the landing place for **Ovajik**, the end of the gulf is reached, and the coast turns north to the town of **Ismid**.

**Kiles Deresi.**—The eastern shore is very low and swampy, containing the delta of the **Kiles Deresi**. This stream takes its rise behind the fine mountain of **Giuk Dagh**, flows down a beautiful valley south of **Ovajik** village, in which part trout are to be found, turns the machinery of a large Government cloth factory at **Kular**, where it debauches into the plain about 4 miles southeast of **Ismid** and discharges through swamps and marshes 1 mile south of the town. The deposit brought down by this stream has pushed forward the delta and is gradually shoaling the depths in the whole of the eastern bay of the Gulf of **Ismid**. Nothing but the lightest boats can enter the mouth of the **Kiles Deresi**.

The flat plain at the head of the Gulf of **Ismid** stretches eastward to **Lake Sebanjeh**, which discharges its waters into the **Sangarius**, eastward, and not into the gulf. This plain is bordered on the south by the magnificent ranges of **Giuk Dagh**, the summit of which is 5,330 feet high, and on the north by lower hills. It rises imperceptibly to **Lake Sebanjeh**, 8 miles away.

**Ismid** is a town with a population, in 1905, of 13,487. It stands on the face of some spurs, sloping south, is built mainly of wood, on stone foundations, and is very picturesque, most of the houses being situated amongst trees and gardens. There is a mosque at the east end of the town, which affords a good landmark.

**Ismid** is the seat of a **Mutesserif**, whose authority extends along the entire south shore of the Gulf of **Ismid**, and along the northern as far as **Guebze**. The small dockyard at the western end of the town has been closed.

The line of the old Roman wall is still to be traced in many places, especially behind the upper part of the town.

**Palace.**—Conspicuous from the sea is the palace of the Sultan, which, though small, is remarkable owing to its white color and

surrounding yellow walls, as well as its commanding position on a hill above the dockyard.

A handsome clock tower is situated a short distance westward from the western gateway of the place. It is lighted at night and affords a useful anchorage mark.

**Communication.**—The railway from Haidar Pasha, a suburb of Skutari, which passes through Ismid, is open for traffic to Angora, also to Konia and Eregli. The service of trains from Haidar Pasha to Ismid takes about four hours. Steamers ply to and from Constantinople every other day. There is a telegraph station.

**Supplies.**—Fresh provisions were plentiful and good water could be obtained. There is no coal kept in stock.

**Anchorage.**—There is excellent anchorage for any number of vessels off the town of Ismid, in 5 to 12 fathoms, stiff mud, the best position being in about 6 fathoms, with the Sultan's palace bearing 348°. Westerly gales blow completely home and raise a disagreeable sea for boats, especially in less water than 6 fathoms, but wind from this direction is not common, and when from any other direction the water is smooth.

**Bank.**—The bight between the town and the mouth of the Kiles Deresi and the water off the eastern part of the town is all shallow, but off the dockyard, and as far east as the customhouse pier, the 3-fathom curve is close to the shore. West of the town the bank again projects 400 yards.

To clear the bank when approaching or leaving, keep the Sultan's palace in line with the western tower of the dockyard walls bearing 45°. These towers are small and octagonal and by no means conspicuous.

**Coast—Derinji Burnu.**—From Ismid the shore trends in a westerly direction  $4\frac{1}{2}$  miles to Derinji Burnu, thence 2 miles to Zeitun Burnu. This is all low coast, with bays, and mostly shallow. The bay, however, just west of Derinji Burnu, on the shore of which stands a kiosk and chiflik of the Sultan, is fairly deep. At Derinji Burnu there are two piers, connected by shore branches to the main line of the Anatolian railway. Derinji Burnu has become a place of some commercial importance, and although the anchorage is open it is considered safe. Steamers of about 3,000 tons can lie alongside the railway pier. There are four mooring buoys abreast the two large granaries situated on the eastern pier.

**Tutun Liman,** the bay immediately east of Zeitun Burnu, affords good anchorage for one vessel, in 8 fathoms, mud, in the center of the bay, with the eastern point of the bay bearing east, and the chiflik which stands a little inland, north.

**Water.**—There is good water running from a pipe into a reservoir just below the chiflik.

**Zeitun urnu**, a low sandy spit inclosing a lagoon, has shoal water extending over 200 yards from the shore.

**Light.**—A fixed red light, 33 feet above high water, visible 8 miles, is exhibited from a mast on a white house, located on the extremity of Zeitun Burnu.

**Coast.**—From Kileri Burnu,  $\frac{1}{2}$  mile west of Zeitun Burnu, the coast turns to north-northwestward, with a low shore for  $2\frac{1}{2}$  miles to Kuchuk Iskalessi, where is situated the railway station of Yaremdji.

**Anchorage.**—There is good anchorage along this coast, with a muddy bottom, in any depth required.

From Kuchuk Iskalessi to Herekhe the coast line trends to the west, and the shore is too steep for convenient anchorage.

**Water.**—There is a good watering place under Kule Tepesi; a copious spring gushes out of the rock, from which a hose can be led to the boat anchored off, but there is no anchorage for a vessel near.

In Herekhe Bay is a large silk manufactory. The anchorage here is not recommended, although a short stay might be made in fine weather, but the holding ground is not good. From this to Dil Iskalessi there is no anchorage.

**Towshanjik** is a large village on the hills, a little back from the sea.

**Kava Burnu (Dil Iskalessi Point)** is  $1\frac{1}{2}$  miles north of Dil Burnu and steep-to. Eastward is an extensive bank of 12 to 18 fathoms, sand and stones. There is a railway station at Dis Iskalessi and a ferry to Hersek.

**Light.**—A fixed red light, 39 feet above high water, visible 8 miles, is exhibited from an iron support over a square white house located on Kava Burnu, east bank of Dilderesi River.

**Coast.**—From Kava Burnu to Deridja Burnu, 6 miles west, the coast is steep-to, with no anchorage.

At Eski Hissar are the remains of an old Byzantine castle, and on the ridge, 1 mile northeast of it, is the reputed tomb of Hannibal, marked by two isolated cypresses. A little farther north is the village of Guebze, with some picturesque groves of cypresses and minarets, only visible from certain directions. The Kaimakam of this district lives at Guebze.

**Deridja Burnu** has yellow cliffs just to the westward of it, and shoal water extends for nearly 400 yards off the point. The village of Deridja is prettily situated on the slopes behind the point. On the ridge northwest of Deridja is an old mill, a very conspicuous mark.

**Yelken Kaya Burnu**, the north entrance of the Gulf of Ismid, is a fine bold point with a high rock close to the land at the point which

is fairly steep-to. Just north are some conspicuous white cliffs 230 feet high.

**Gulf of Ismid Light**, flashing white, 66 feet above high water, visible 13 miles, is exhibited from a white circular stone tower located on Yelken Kaya Burnu, north side of the entrance.

**Uch Burnu**, a flat peninsula with three low points, though 70 feet in height, appears lower on account of its shape and is not easily distinguished from the back land.

**Tuzla Bay** is a considerable bight and affords anchorage and protection for a large number of vessels in northerly winds; although exposed to the southwest, the holding ground is very good and the sea is not heavy. The sand and coral which the lead will bring up in depths under 18 fathoms is underlaid by mud of a slimy character, in which the anchor will get a good grip.

**Anchorage** may be taken anywhere, according to circumstances. For a small vessel a berth in 7 fathoms, with the left extreme of the town bearing  $16^{\circ}$  and the point of Mezar Burnu (on which is a conspicuous clump of cypresses) east, will be found convenient, and in westerly gales, somewhat under the lee of the land running out to Tuz Burnu. For a large vessel a berth more to the southward will be better.

**Banks.**—Shoal water stretches 300 yards southward of Mezar Burnu and 800 yards northeast of the eastern Deserter Islet. There is also a 22-foot bank  $\frac{1}{2}$  mile  $22^{\circ}$  from the eastern Deserter Island, which obstructs the anchorage ground.

**Current.**—A strong current generally sets west through Tuzla Bay and past the Deserters.

The Mungafa rivulet rises in some beautiful springs 1 mile inland, but the water is impregnated with gas and is insipid to the taste.

**Tuzla village** is of the usual dilapidated character, and contains a population of about 2,000. The railway station is 1 mile northeast of the village. A small breakwater from Liman Burnu gives protection to caiques and affords good landing in all weathers.

**Water.**—There is good water in a well adjoining the chapel, behind the vineyard, at the western end of the village. Supplies are scarce and indifferent.

**Tuz Burnu** is a peninsula with rocky shores of the same character as Uch Burnu, and about the same height. Rocks, awash, and above water, are scattered around it, the farthest danger being the Selvi Rock with 6 feet on it, 600 yards  $216^{\circ}$  from the point. On Tuz Burnu are some large salines from which it takes its name.

**The Deserters** are two rocky islets lying  $163^{\circ}$  1,400 yards and  $135^{\circ}$  1 mile from Tuz Burnu, on separate banks, with navigable channels between them and the mainland. The eastern island is culti-

vated and has some large subterranean tanks of Byzantine architecture. Shoal water and foul ground stretches  $\frac{1}{2}$  mile northeast.

**Directions.**—Vessels may pass southward of the islets within 100 yards. Coming from the north, and intended to anchor off Tuzla village, there is a capital channel to the north of the Deserters, with a good leading mark, viz, Towshan Tepe (a detached hill to the southward of the Aidinli Hills), in line with the north summit of a distant saddle hill, bearing  $63^{\circ}$ . This will lead through in 7 fathoms to the anchorage off Tuzla.

There is nothing to be gained under ordinary circumstances by passing between the two islets, but, if necessary, the western of the two houses on the isthmus at the back of Tuz Burnu, in range with the summit of Andreas Island, bearing  $2^{\circ}$  will lead through in  $6\frac{1}{2}$  fathoms.

**Coast.**—**Ay Giorgios Burnu**,  $\frac{3}{4}$  mile northward from Tuz Burnu, rises to a summit 75 feet high. From there the coast trends eastward and northward, forming a bay at the head of which are a few houses and a breakwater.

**Andreas Island**, rocky, 145 feet in height, and having a clump of pine trees on its summit, situated  $1\frac{1}{2}$  miles northeast from Ay Giorgios Burnu, and on the south side of the entrance to Paulo Bay, stands on a 2-fathom bank which connects it to a peninsula projecting from the mainland. The trees distinguish it from Paulo Burnu, which is of a similar shape, but bare.

**Paulo Liman** is a large bay with even depths of 6 and 7 fathoms over a large area. Holding ground is excellent, and the island of Andreas affords good shelter from southwest winds to a small vessel anchored in the southern corner of the bay, and even to a ship more in the center, but the main part of the bay is open to the westward. The shores of the bay are low, and on the south side is a large open lagoon used as a fish preserve.

**Buyuk Dere River**, which falls into the northeast corner of the bay, has a shoal bar, but is used by caiques as a port for local trade; above, it is a mere rivulet.

**Paulo Burnu** is a bare island peninsula, 165 feet in height, with rocky shores.

**Mavro** is a small low island covered with trees, 400 yards northward of Paulo Burnu. Inside is a shallow bay used by the native caiques.

**Pendik**, a small but growing town, is the farthest of those populated by Europeans.

**Communication.**—Daily steamers and train service connect it with the metropolis, 15 miles away.

**Anchorage.**—Pendik Road is a good anchorage in the summer northeast winds, but not in other circumstances.

**Water.**—There is a good watering place near a large plane tree  $\frac{3}{4}$  mile east of the town, where a hose can be led directly into a boat from a running stream.

**Kartal** is a larger town than Pendik, but the anchorage is not good.

**Mal Tepe Burnu** is fairly high, with a rocky shore. A 5-fathom bank extends southward nearly  $\frac{3}{4}$  mile, following the eastern side of Prinkipo Channel.

**Drakos Tepe.**—Immediately back of Mal Tepe Burnu rises an isolated, bare, rocky, hog-backed hill, 350 feet in height, called Drakos Tepe. The railway runs at the back of it.

**Coast.**—From Mal Tepe Burnu the coast is low and straight in a north-northwesterly direction for 3 miles. It then curves to west-northwestward, and is much broken up into little bays, with low red cliffs, for  $3\frac{1}{2}$  miles to Fanar Bagche. The land behind slopes gently upward to the mountains on Kaish Dagh, a treeless, but fairly cultivated, ridge, 1,400 feet high, standing 3 miles back from the coast.

**Mal Tepe** is a small semi-European village.

**Anchorage.**—There is anchorage off all this coast, the water shoaling very gradually to the shore. A shoal bank extends off for about 300 yards, but outside that a ship may anchor anywhere between the mainland and the Princes Islands, in 6 to 17 fathoms, sand and mud, excepting near the shallow water about to be described.

**Mal Tepe Bank**, of sand and coral, is an extensive area, with an average depth of 4 fathoms, that projects for nearly 2 miles from the coast between Mal Tepe and Bostanji. It has four clusters of rocks, which much encumber the passage between the Princes Islands and the main.

**Vorthonas**, the outer rock, is 3 feet high and stands at the western extreme of the Mal Tepe Bank, about midway between Mal Tepe and Proti Island. One hundred and fifty yards westward the water deepens abruptly to 10 fathoms. Four hundred yards  $56^\circ$  from Vorthonas, on the same bank, is a small cluster of rocks 1 foot high. Shallow water extends for 1,600 yards farther northeastward.

**Batmez Vorthonas**, nearly 1 mile  $22^\circ$  from Vorthonas, is 3 feet in height. It is surrounded by a 3-fathom bank 500 yards in length.

**Sikli Vorthonas**, the northernmost rock, is only 3 feet high, and has a very small patch of shallow water round it.

Between these banks and the mainland is a 24-foot channel, nearly  $\frac{1}{2}$  mile wide, but of little service for navigation.

**Landmarks.**—On the peninsula formed by the Gulf of Ismid, the Bosphorus, and the Black Sea are several mountains which serve as landmarks from various directions. Coming from the westward, Aidos Dagh, Kaish Dagh, and the intervening hills are the most conspicuous. These stand not far from the coast, east of the Princes

Islands, Aides Dagh, 1,733 feet, being the highest land about. Northward of these, the two rounded summits of the Chamlija Hills, 850 feet high, show up well in front of Alem Dagh and Chatal Dagh, which are 11 miles inland, and do not appear remarkable from this side.

**Alem Dagh** is 1,460 feet high, and stands 7 miles  $101^{\circ}$  from Kandilli on the Bosphorus.

**Chatal Dagh**, called by the English navigators The Brothers, is a hill with two equal and similar peaks, 1,270 feet high, and lies 4 miles  $123^{\circ}$  from Alem Dagh. Coming from the eastward in the Black Sea, Alem Dagh and Chatal Dagh are very conspicuous, the former appearing as a single peak. There are other summits in this locality, but those mentioned are by far the most conspicuous.

**Fanar Burnu** is a small peninsula-shaped point, flat, edged with red and white cliffs, 10 feet high, and well covered with trees, the grassy ground under which is the resort of many Greeks and Turks on holidays. It projects about  $\frac{1}{2}$  mile southwest of the general line of coast and forms the south side of Moda Bay. The ancient Chalcedon was built on and immediately east of Fanar Burnu. Villa residences now cover the site, which is known as Fanar Bagche.

**Fanar Burnu Light**, fixed white, 83 feet above high water, visible 12 miles, is exhibited from a white, circular, stone tower located on the west side of the point.

**Hereke Tash**.—This rock lies a little over 200 yards west-southwestward of Fanar Burnu and has a pile of stones on it 10 feet high. There is deep water 150 yards west of the rock, and a 2-fathom passage inside it for boats.

**Moda Liman**.—North of Fanar Burnu is the small bay called Moda Liman,  $\frac{3}{4}$  mile long and the same distance across. Its southern and eastern shores are low, but the northern is a cliff 50 feet in height. The bottom of the bay is shoal, but in the middle and outer portions are from 4 to 6 fathoms water, sand and mud bottom.

The Kurbagha Deresi falls into the north corner of Moda Bay. A boat can get about  $\frac{1}{4}$  mile up the river, as far as the Kadi Kioi cricket ground.

**Fanar Bank** is a long sandy bank which stretches  $1\frac{1}{2}$  miles  $191^{\circ}$  from Moda Burnu, the northwest point of Moda Bay, with  $3\frac{1}{2}$  fathoms water on its shoalest part, and closes Moda Bay to large vessels from the west. Between its eastern edge and Hereke Tash is a narrow 7-fathom channel, leading into the bay, but no particular marks can be given for it.

**Clearing mark**.—The right extremity of Dolma Bagche Palace, open west of Leander Tower, bearing  $358^{\circ}$ , clears the Fanar Bank to the westward. This clearing mark can also be used by night,



Leander Tower exhibiting two fixed red vertical lights, and Dolma Bagche Palace being distinguishable by a distinct line of lights.

**Moda Burnu.**—The northwest point of Modoa Bay is a cliffy faced headland. On the point, and extending north and east from it, is the thriving and extending suburb of Kadi Kioi, populated mainly by Europeans.

**Coast.**—From Moda Burnu the coast trends north for  $2\frac{1}{2}$  miles to abreast Leander Tower. This shore is in some parts low and in others bordered by sloping cliffs, but is edged throughout by a rocky flat with detached bowlders. This makes landing difficult everywhere, excepting in the bight between Kadi Kiori Haidar Pasha, which is sandy.

**Rocky Ridge**, probably a relic of an ancient mole, stretches 300 yards from the shore  $\frac{1}{2}$  mile north of Moda Burnu. A pier is being built on it.

**Haidar Pasha.**—One-half a mile north of Rocky Ridge is Haidar Pasha, the terminus of the Ismid Railway, which extends to the quay, where the steamer from Constantinople comes alongside. The cemetery is along the top of the cliff, just north of Haidar Pasha, and again a little to the northward are the Selimiyyeh Barracks, enormous yellow painted buildings, with square towers at each angle, and which serve as a leading mark on making the Bosphorus. Behind these the town of Skutari begins.

**Harbor.**—The harbor is formed by a breakwater 650 yards long, nearly parallel with the coast. There is a quay, 330 yards long, with an arm projecting 165 yards from its southern end. An elevator, situated at the northwest end of the quay, is capable of dealing with 2,400 tons of grain per day.

Alongside the quays there is a depth of 22 feet, and between the quays and breakwater the general depth is 24 feet. The northern entrance is 400 yards wide; the southern, which is only used by small vessels and boats, is 130 yards wide.

A pier is being built at Kavah Burnu, about  $\frac{1}{2}$  mile to the northward of the harbor.

**Buoys.**—Two black buoys, with cylindrical topmarks, are moored on the northeastern side of the north entrance channel in a depth of 26 feet to mark the limit of the fairway.

There are three mooring buoys in the harbor.

**Lights.**—On each end of the breakwater stands a white lighthouse, 47 feet in height. An obelisk stands on the center of the breakwater.

A fixed red electric light is exhibited from the northwestern lighthouse and a fixed green electric light from the southeastern one. These lights are elevated 46 feet above the sea and should be visible from a distance of 12 miles.

A fixed green light is shown from the northwest corner of the quay and a fixed red light from the southwest corner of the arm.

**Directions.**—By day, vessels entering the harbor from the northward must leave the black buoys with cylindrical topmarks on the port hand.

By night, the fixed red light on the southwest angle of the quay should be kept midway between the fixed green light on the northwest corner of the quay and the fixed red light on the northwest end of the breakwater.

Strong gales from west and southwest send in a little sea.

**Bosporus approach—Anchorages.**—From the extremity of the Fanar Bank to Leander Tower is a good anchorage ground of variable width and generally out of the current. From Leander Tower to the Selimiyyeh Barracks it is narrow, and the edge of the shore bank is steep. It must therefore be approached with caution, but this is the part that is most used as an anchorage, mainly by steamers waiting orders or only calling for a few hours, to whom it is the handiest position for communicating with Galata.

South of the Selimiyyeh Barracks the anchorage ground widens considerably, and from abreast them to the southward of Moda Burnu is over  $\frac{1}{2}$  mile wide, with depths of 5 to 14 fathoms. Here, in fact, the deep-water channel leading from the Bosporus is very narrow, and with the exception of this a vessel can anchor anywhere across from Stambul to Kadi Kioi. This ground is, however, but little used, as it is too far to leeward with regard to the current for communication.

There is also good holding ground and convenient depth anywhere between the Princess Islands and the shores of Europe, but of no service save for a fleet or to a vessel becalmed and carried away by the current.

**Princes Islands**, nine in number, take their name from Prinkipo, the largest of the group, and lie parallel to the coast of Asia, south of the entrance of the Bosporus, from which the nearest is 6 miles. They are in general high, with cliffs of a bright red and yellow hue, owing to the large amount of iron and other minerals in the composition of the rock. The four larger islands—Prinkipo, Halki, Antigone, and Proti—which are inhabited, are the summer residences of many of the European merchants of Constantinople, Prinkipo being the favorite. The others are little better than barren rocky islets.

**Water** is only obtained by tanks, into which the rain is led.

**Prinkipo** (lat.  $40^{\circ} 51\frac{1}{2}'$  N., long.  $29^{\circ} 7\frac{1}{2}'$  E.), the largest of the group, is celebrated for its fine healthy climate, which is doubtless partly due to the dwarf pines with which a large part of the island is covered, and also to the comparative dryness of the northeast wind.

It lies 10 miles  $46^{\circ}$  from Seraglio Point, and its length from north to south is over 2 miles by an average of  $\frac{3}{4}$  mile in breadth.

The island is high and is divided into two portions by a dip in the hills. The southern and highest portion, 655 feet in height, is bare, rocky and uninhabited, save for a monastery on its summit. The northern portion of the island is clothed with dwarf pines, and on this face is the town of Prinkipo, with its prettily arranged villas, standing for the most part in gardens. There is telegraphic communication by cable with the mainland. A pier is situated on the western side of the island, off which there is a mooring buoy.

**Prinkipo Bank** is a sand and coral shoal that extends off the north shore of the island for  $\frac{1}{2}$  mile, with only 2 and 3 fathoms on it. The edge of this shoal, which is of very irregular shape, is mostly steep on all sides, and care must be taken on anchoring to give it a berth.

**Prinkipo Channel.**—Between Prinkipo Bank and the shoal water extending south from Mal Tepe Point is a 6-fathom channel,  $\frac{3}{4}$  mile wide, with several 5-fathom patches in it.

To pass through this channel, and northward of Prinkipo Bank, keep Pita Island summit open north of Halki Island, bearing  $271^{\circ}$ , which will lead in 5 fathoms.

Around the other shores of Prinkipo, 5 fathoms will be found 200 yards offshore, excepting off the northern part of the west shore, where that depth is nearly 400 yards from the shore.

**Andirovitha**, a small island, 180 feet high and  $\frac{1}{2}$  mile in length, lies east of Prinkipo, from which it is separated by a deep channel 1,200 yards wide.

A patch of  $4\frac{1}{2}$  fathoms lies 400 yards northward of Andirovitha, which is otherwise fairly steep-to.

**Niandro** is a rocky islet, 85 feet high, 1 mile southward of Prinkipo. A rocky bank, with from 4 to 30 fathoms, extends off the north and east sides 300 yards.

**Halki**, 445 feet high, the next island northwestward of Prinkipo, is  $1\frac{1}{2}$  miles long by  $\frac{3}{4}$  mile wide and fairly steep-to on all sides, except to the eastward. It has a number of dwarf pines on it, but is otherwise bare and rocky. The town lies on the eastern side and is much smaller than the settlement at Prinkipo.

**Colleges.**—The Turkish naval college is situated at the eastern point of the island. On the rounded elevation which forms the northern portion of the island is a Greek theological college, and on the dip of the hill north of the Cham Liman is a large Greek secular college. There is a telegraph station on the island.

On the south side of the island is a picturesque little bay, called Cham Liman, in which there is room for two ships to moor in 8 fathoms, but it is completely open to the south.

**Halki Channel**, between Prinkipo and Halki, is 1,300 yards wide, but much narrowed by the shoal banks which project from either island, and though there is a  $5\frac{1}{2}$ -fathom channel, it is so narrow that without buoys a ship can not make certain of carrying more than  $4\frac{1}{2}$  fathoms through, as there is no leading mark. At the latter depth there is a passage 600 yards wide, to pass through which it is only necessary to keep in mid-channel.

**Antigone**, lying west-northwestward from Halki, is a square-shaped island, 535 feet high,  $\frac{3}{4}$  mile across, and fairly steep-to on all sides, with a little pine wood on its summit and along the southern spur eastward. Otherwise it is rocky and bare. The south coast is a fine cliff 500 feet in height. On the east side, and just south of the village, a rough mole projects 200 yards from the shore and protects the landing pier from southwest gales.

**Pita**, a bare rocky islet between Halki and Antigone, 60 feet in height, has anchorage and a navigable channel on both sides of it. Between the south end and the mole stretching from Antigone is a channel, 350 yards wide and 8 fathoms deep; and between Halki on the southeast and Antigone and Pita on the northwest is an 8-fathom passage 500 yards wide. This latter is a capital anchorage, with good stiff mud holding ground with a surface of coralline.

**Proti**, 375 feet high, 1 mile north of Antigone, is similar in size and shape but is perfectly bare. The settlement is the smallest of those in the Princes Islands. Shoal water nowhere extends over 250 yards from the coast, and the channel between Proti and Antigone is wide, deep, and clear.

**Plati**, a rocky islet, 150 feet high and  $\frac{1}{4}$  mile in length, lies  $2\frac{1}{2}$  miles  $258^\circ$  from Antigone. It has been cultivated, and there are still a good many fruit trees on it. A castellated residence on the summit is now falling into decay, but looks imposing at a distance. The island is steep-to excepting at the eastern end, where a shoal extends off for 150 yards, and there is good landing in an artificial camber at the eastern point.

**Oxia**, nearly 1 mile northwest of Plati, is a steep mass of marble, 300 feet in height, and the resort of the sea birds of the vicinity, which breed here in great numbers. A bank, with 5 to 16 fathoms, extends 300 yards off the northern and eastern sides.

**Current.**—The current generally sets to the southwestward in all the channels which Princes Islands form with each other, but it then turns and sets slowly to the northwestward, near the shore, between Tuz and Fanar Points.

## CHAPTER IV.

### THE BOSPORUS.

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**General description.**—The Bosphorus may be said to begin at Seraglio Point on the European shore and the town or Skutari on the Asiatic shore, and to terminate at the entrance of the Black Sea at the two capes, on which are built the lighthouses of Rumili and Anatoli. Its length from the Sea of Marmara to the Black Sea, including its numerous windings, is about 17 miles. The breadth varies from 800 yards to  $1\frac{1}{2}$  miles, and the general direction is south-southwest and north-northeast. Like the Dardanelles, it resembles a river with abrupt and angular windings, the projecting points of which break the impetuosity of its stream, quiet its surface, and afford shelter under their lee. The northern part of the Bosphorus, however, from Buyukdere to the Black Sea is straight, and its general direction is northeast. The depths in the Bosphorus are from 20 to 66 fathoms, over a mud bottom.

Both shores are studded with painted houses, many being magnificent palaces, in a quaint and picturesque manner. The European side is covered with them throughout its length, but on the Asiatic shore they are separated by rather longer intervals and are everywhere backed by hills, whose rich vegetation admirably varies this noble spectacle.

At Old Seraglio Point the Golden Horn, the port of Constantinople opens out, the waters of which present a scene of great activity from the steamers and numerous light and elegant caiques skimming over it. On its south shore stands the city of Constantinople, and on its north shore, the towns of Topkhana, Galata, and Pera, which lie close to each other, and appear as one, being built on the same hill.

On both sides of the northern end of the Bosphorus are numerous fortifications, built at different times and in various styles.

**Directions.**—A steam vessel, or a sailing vessel with a strong fair wind, should keep on the European shore, closing it gradually as Orta Kioi Point is approached. By acting thus, the vessel will keep in the eddy or countercurrent, the boundary line of which may be clearly perceived between Topkhana and Defterdar Point and will meet, in proceeding northward, no other difficulties than those arising from the numerous vessels that are always riding at anchor in this part of the Bosphorus, taking care not to come within 100

yards of Orta Point, to avoid the small bank which fringes it. At Defterdar Point the countercurrent loses its strength, but the main current is scarcely felt.

After passing Orta Point close the shore, and keep in the eddy that reaches to Arnaut Point, taking care to avoid Duimi and Kuru Banks, which are marked by a lighthouse and a white house, respectively. A vessel could pass between these shoals and the village, but it will be prudent at all times to pass outside them, unless wishing to make fast to the shore. On clearing these banks again hug the shore till close up to Arnaut Point, when, by gradually edging across the current for the opposite coast, the vessel will fetch a little southward of Kandilli. In rounding Kandilli, give it a berth of at least 100 yards, to avoid the fringing shoal of  $3\frac{1}{2}$  fathoms, but be ready to give immediate port helm when the current catches the starboard bow.

**Kandilli to Kiobashi Point.**—Between Kandilli and Khanlijeh the shore must again be neared, recollecting, as Anadolu Hissari is approached, to keep 200 yards from the shore, in order to clear the bank which fronts the mouth of the Kuchuk Ghiok Su.

Having advanced as far as Khanlijeh Point, slant across the current and close the coast of Europe, where the vessel will be greatly favored by the eddy that runs from the Balta Liman to Kiobashi Point, taking care, in approaching that point, to bring Rumili Hissar on with Khanlijeh Point to avoid Yeni Kioi Bank. A good berth should be given to the lightvessel marking Yeni Kioi Bank, as her position changes slightly with the varying strength of the current.

**Kiobashi Point to Rumili Light.**—From Kiobashi Point sheer across the current and pass into Beikos Bay, where the vessel will profit by the eddy up to Selvi Burnu, when a course may be steered either eastward or westward of Englishman Banks.

Vessels well used to the navigation of the Bosphorus frequently pass eastward of the banks when coming from the southward, for, besides shortening the distance, they can, in case of meeting with a foul wind, easily turn to windward, as the current is always weaker in this bay than in the main channel, and moreover, when close in, they will be assisted by a weak eddy to the northward. Caution, however, is requisite, as Umur Bay is generally crowded with shipping.

The tree near distant tall house just open of Bushy Peak  $15^{\circ}$  leads eastward of Englishman Banks and westward of the shoal flat bordering Selvi Burnu.

The tall house on summit ridge, in range with the right extreme of a conspicuous yellow house on Telli Point,  $22^{\circ}$ , leads westward of Englishman Banks.

After passing Englishman Banks the vessel should again close the coast of Europe at Mezar Point and run along that shore to the Black Sea.

With a fresh southwesterly breeze the vessel may follow the Asiatic shore, and will find slack water in Majar and Kechili Bays; but this course is not to be recommended, as from their great depth of water they afford no convenient anchorage, besides the liability to calms under Giants Mountain.

**Dikili Rock.**—A vessel may pass either eastward or westward of this rock, which has a beacon on it. In the passage between the rock and the shore there is a depth of 9 to 13 fathoms.

Give a berth of 300 yards to the point which lies  $\frac{1}{2}$  mile northeast of Rumili Kavak, on which there is a guardhouse, as it is bordered by a flat and rocky ledge extending 200 yards from the shore.

Give a berth also of 300 yards to the foul ground in the neighborhood of Buyuk Bay.

**A sailing vessel, with a foul wind,** should employ a tug, as it is impossible, even with a smart vessel well handled, to proceed at once through the Bosphorus into the Black Sea against a foul wind, owing to the strength of the current in different parts of the channel.

There are numerous tugs at Constantinople.

**Currents.**—In whatever direction the wind may be, the current almost invariably sets from the Black Sea to the Sea of Marmara, it being fed by the superabundance of water poured into the Black Sea in winter by the great rivers and in the spring by the thawing of the snow. Its general direction is that of the channel, but the numerous windings produce a variety of countercurrents and whirling eddies under the points.

The axis of the current is generally in the middle of the strait, and its edges are almost always defined by straight lines from point to point on the same shore, with the exception of Kiobashi Point, round which it curves outside the bank. Between these lines and the shore, especially in the bays and behind the points, it always leaves an eddy, which increases in strength according to the rapidity of the main current.

The strength of the current in the channel is nowhere uniform and is influenced by so many different causes that only a general estimate can be given of it for the use of the navigator. The variations in the breadth of the Bosphorus are one of those causes, but the great fluctuations in its rapidity and direction are partly due to the angular forms of the two shores, the disposition of their points and elbows being such that in some places the waters are occasionally driven from them toward the opposite coast with such violence that their first direction is almost reversed.

Again, the winds and the seasons are some of the principal causes which modify the current in the Bosphorus; and the period when the snow thaws, which is about the time when north and northeast winds prevail, may be supposed to bring on the maximum of its rapidity. This generally happens between the latter part of June to the end of August, when it sometimes attains the rate of 5 or 6 knots in certain parts of the channel, and is impossible to stem in a sailing vessel, unless with a fair wind. This strength decreases with southerly winds, and when the principal causes just named cease to act it becomes very weak.

In the autumn it has been observed that fresh southerly winds in the Bosphorus will in a few hours arrest the southerly current and cause it to flow to the northward with a velocity, depending on the strength of the wind, and which sometimes reaches 2 or 3 knots. This current occasionally continues for a day after the southerly wind has ceased.

Southerly winds, which are violent and lasting in the Archipelago, and are more or less felt in the Sea of Marmara, have the effect of decreasing the action of the current both in the Dardanelles and the Bosphorus, especially if they blow after a gale from the northeast, which has left the level of the Black Sea very low at the entrance to the Bosphorus. By keeping back the water of the Black Sea, a strong southerly gale raises the level of the Bosphorus, which rising, although amounting to 2 feet, is rarely enough to destroy the difference of level between Marmara and the Black Seas, the first and absolute cause of the constant direction of the current to the southward.

If immediately following this rise, or if after a south gale, the winds shift suddenly to the north and blow hard, the waters of the Black Sea are sent with such force into the Bosphorus that they break with impetuosity on the advanced point of Kiobashi, causing a strong countercurrent, which very often extends halfway across the strait.

At such time, except during the depth of winter, when both wind and current are very violent, a smart sailing vessel, if advanced as far as Khanlijeh, and well handled, by making short boards in the eddies and countercurrents, might easily beat up to Kiobashi Point. From thence she may cross to the coast of Asia, work up along Beikos Bay, and then eastward of Englishman Banks, by which process she would no doubt reach Buyukdere Bay.

The set of the current in the various parts of the Bosphorus is now given.

From the Black Sea the current runs in a southwesterly direction, the ordinary velocity being about 2 knots, and parallel to the coast of Europe, toward Buyukdere Bay (which it does not enter) to Kirich Point  $\frac{1}{2}$  mile northward of Therapia, passing over Englishman Banks,



and washing Kiobashi Point. Thence taking a southeasterly direction, it shoots over to the Asiatic shore a little south of Injir Bay.

From the southward of Injir Bay it runs along the Asiatic coast as far as Khanlijeh, whence it is again deflected toward the European shore, attaining a velocity of 5 knots between the two Hissars, or castles, of Rumili and Anadolu, and strikes the western shore at Arnaut Point. At this part it has been named the Devil's Current.

Between Arnaut Point and Defterdar Point it follows the direction of the two shores, with a marked tendency to advance toward that of Asia, till, having passed Defterdar Point, it directs itself almost wholly toward Skutari.

The current at the entrance of the Bosphorus from Skutari sets strongly over to Old Seraglio Point, which divides it into two branches, the southern one falling into the Sea of Marmara. The western stream, filling the Golden Horn, rushes up as far as the second bridge at the entrance to the naval port and abreast the dry dock in the arsenal. It is there met by the current coming down from the upper basin, and, turning round to the eastward, washes the quays of Galata and Topkhana, leaving behind it a zone of eddies which vary every six hours.

It is difficult to state exactly how far this reaction extends northward, probably not beyond Defterdar Point, where it again turns and mixes with the main current down the Bosphorus.

An eddy does, however, sometimes continue about  $1\frac{1}{2}$  miles to the northward of Defterdar Point, or nearly up to Arnaut Point, and, what is very extraordinary, between these two points it is stronger than that part of it between Topkhana and Defterdar Points. This is a singularly favorable circumstance to the navigation of the Bosphorus, for it occasionally attains a velocity of 1 knot, and extends in breadth more than 400 yards from the shore.

**Winds and weather.**—In the Bosphorus the usual winds are those from the north to northeast and south to southwest. Northeast winds are the most frequent. Northwest and southeast winds are but seldom felt.

The wind is generally variable at the time of the equinoxes, but during the summer months, from the beginning of May to the middle of September, the Meltem or solar winds blow very steadily from north and northeast and bring fine weather. These winds spring up early in the forenoon, increase in strength until 3 or 4 p. m., and fall with the sun, calm prevailing through the night.

During the other months of the year the winds are variable in the southwest quarter, except about full and change of the moon, when they sometimes veer to the northeast. Southwest winds, when strong, are generally accompanied with rain, but with fine weather when they are light; in the winter they bring fogs.

In summer the winds never blow across the Bosphorus, although that may sometimes happen at either of its entrances. Thus, in the morning light southeasterly breezes occasionally come in from the Sea of Marmara, and light northwesterly winds in its northern reach, especially about Buyukdere Bay. In the intermediate space, if there be land breezes they are very light, and do not reach mid-channel.

During the day sometimes a smart gale springs up from the eastward, but it never lasts after sunset.

Northerly winds with fine weather freshen in proportion to the heat of the sun.

In summer it sometimes happens that the wind is from southwest in the southern and from northeast in the northern parts of the channel, leaving it calm between Arnaut Point and Selvi Burnu, and it is not of rare occurrence to see vessels going different ways, both with a fair wind. In these cases, if the breeze is fresh from northeast it will be certain to prevail, and the vessel coming from the southward should immediately make for an anchorage unless prepared to work to windward. At other times southwesterly winds blow strong at Buyukdere and in the upper part of the Bosphorus, while they are hardly felt at Constantinople, or they do not reach it till some hours later. When this takes place the wind is sure to be from southeast in the Black Sea, and favorable for vessels bound to Odessa or the Sea of Azov.

In winter southwesterly winds are frequent. When they blow hard, with an overcast sky, and the barometer is down to about 29.60 they are generally accompanied with rain, and last several days. As they moderate, the temperature becomes milder and the weather fine, which is in fact its usual feature during this season. Bad weather generally comes on after sunrise and rarely lasts beyond sunset. If it should last all night a gale of wind may be expected. In this season sudden shifts of wind are frequent and dangerous.

If a light southerly wind commences to blow in the afternoon, immediate advantage should be taken of it, as in that case the wind generally veers round to the northward at midnight and blows hard.

In winter strong winds from northeastward are always accompanied with rain, which generally clear away as they moderate.

Snow sometimes falls in February and at the beginning of March, when the wind is light from the northward, with hazy weather.

#### THE EUROPEAN SHORE OF THE BOSPORUS.

**Golden Horn (Port of Constantinople)** (lat.  $41^{\circ} 1' N.$ , long.  $28^{\circ} 59' E.$ ), is a good harbor, always crowded with vessels of all nations. It was known by this name in the time of the Greek Empire, being then the center of the commerce of the world, whose produce is

received. It extends 3 miles in a northwesterly direction and then 1 mile north and northeast. Its breadth varies from 400 to 800 yards from its mouth up to its northern extremity, which forms a basin, named in Turkish, Kiaghat Khane, or the Sweet Waters of Europe, and into which flows a small stream named the Lykus.

**Port regulations.**—Except in case of unforeseen accident, vessels are forbidden to anchor between the new bridge and a line drawn from Seraglio Point to the outer line of buoys without a written authorization from the captain of the port.

Except in case of fire, no tugboat, local passenger boat, or trading vessel is permitted to be under way between one hour after sunset and half an hour before sunrise.

**Constantinople Light**, fixed and flashing white, 115 feet above high water, visible 16 miles, is exhibited from a white tower located northeast of Seraglio Point.

**Approach.**—A vessel in approaching Constantinople from the Sea of Marmora, on passing Stefano Point, will quickly observe on the port bow numerous domes and spires, surmounted by the golden crescent. On a nearer approach the south side of the city opens out with its numerous mosques and crowded houses, painted in various colors, the whole mass rising in the form of an amphitheater from the middle of a forest of cypress. Near its western angle is seen the Tower of Marmora, on the margin of the sea, and the famous State prison, called the Castle of the Seven Towers.

On the Asiatic coast also will be seen the mountains of Kaish Dag and Aidos Dag, situated about 3 miles from the shore east of the Princes Islands, which serve as marks for vessels coming from the Sea of Marmora, and northwestward of them rises Mount Bulghurlu, or Chamlija, at the foot of which lies the large town of Skutari, with a forest of cypress surrounding a vast cemetery.

**Anchorage and wharves.**—To facilitate the immense intercourse to which the commercial transactions of Constantinople and Galata give rise, two bridges have been thrown across the harbor which separate the naval from the commercial parts of the port. The eastern or new bridge consists of masonry arches resting on iron pontoons. The central sections are movable and allow a passage 90 feet wide. The western or old bridge is about  $\frac{1}{2}$  mile above the new bridge, its construction being similar. No vessels go above it excepting Turkish naval vessels.

Between the two bridges is the commercial port, in which vessels are moored head and stern to buoys placed for the purpose, being admitted early in the morning. It is now only used by sailing vessels. The depth of water is 12 and 13 fathoms along the northern quays, 20

to 22 fathoms in the middle, and 10 to 13 fathoms off the quays of Constantinople, over mud bottom.

The Galata quays, opened in 1895, consist of a narrow strip, 810 yards long, extending from the new bridge to the Topkhana Arsenal, having depths of 36 feet alongside in the center, 30 feet at their western end, and 24 feet at the eastern end. These quays are chiefly used by tugs, and by the steamers engaged in the local traffic.

**Buoys.**—The foreign trade of Constantinople is carried on by steam vessels, for whose convenience buoys have been laid down outside the new bridge between Old Seraglio Point and Topkhana. There is at present accommodation for about 30 vessels between the buoys. The principal regular lines of steamers have certain buoys assigned to them for their sole use, and it is only at the four north-eastern buoys that chance steamers may make fast, and that only for 24 hours. For this temporary accommodation no charge is made.

**Directions.**—A steam vessel, after rounding the shoal off Seraglio Point, may approach within 200 yards of the quays, guarding against the current, which has a velocity of  $4\frac{1}{2}$  knots; but, owing to the large number of vessels generally assembled in this locality, it is preferable to keep the Asiatic shore on board until abreast Leander Tower, then steer across to the European shore.

A sailing vessel, with a fair wind, having passed Stefano Point, should close the shore of Europe in order to avoid the current and profit by the eddy, and also be in a position to anchor under the walls of the city if the wind should fall light or calm.

With a fair wind she may, preserving a depth of not less than 5 fathoms water, close the land between the Seven Towers and Seraglio Point to within 600 yards, and after rounding the shoal off Seraglio Point, to which point a berth of 800 yards should be given, should keep nearly in mid-channel, which is eastward of the strength of the current until the port of Constantinople is well open. Then, edging across the current for the artillery quay at Topkhana (lat.  $41^{\circ} 1' N.$ , long.  $28^{\circ} 59' E.$ ), she will be able to gain an anchorage in the port. By acting thus a vessel will avoid the strength of the current, which sets on to Seraglio Point, and will have time to stow her sails and pick out a good berth in the port.

A sailing vessel, with a foul wind, having worked from Stefano Point to Seraglio Point during daylight, should take a tug, or anchor either off Seraglio Point or off the Asiatic coast and await a fair wind.

The anchorages along the Asiatic coast, from 1 mile north of Fanar Point to Leander Tower, are generally preferable to that under the walls of Constantinople for vessels going farther up the Bosphorus, as it often happens that strong south and southeast winds reach this anchorage, while it is calm on the opposite shore. Also there is no

sea with northerly winds, and a vessel will lie sheltered from the currents of the strait.

**Towboats.**—There are numerous tugs available. Two floating steam fire engines are held in readiness to render assistance at once. One engine is stationed outside the new bridge, the other is kept between the bridges.

**Constantinople** (lat.  $41^{\circ} 0' N.$ , long.  $28^{\circ} 57\frac{1}{2}' E.$ ).—This great city called Istanbul, or shortly Stambul, by the Turks, is built on the triangular promontory which forms the west side of the south entrance to the Bosphorus. It is surrounded by an old wall or rampart, flanked by 20 towers, with a good moat and pierced by 28 gates, of which 14 open toward the harbor. Near the gate of Adrianople are still seen the ruins of the palace of Constantine and the breach in the wall where the last Greek Emperor was killed. Both towers and walls are in a very bad state. The castle with the Seven Towers consists of seven towers, united by galleries.

Constantinople, like ancient Rome, covers seven hills, and the population, including the suburbs, may be estimated at 1,106,000 persons. Its houses are mostly built of wood, and consequently exposed to numerous and terrible fires, and its streets are narrow.

The chief manufactures are those of silk and cotton fabrics, firearms, morocco leather, saddlery, horse trappings, and shoes; and other articles of ordinary use and consumption, also meerschaum tobacco pipes. The fisheries of Constantinople are important; the harbor and adjacent sea abound with shoals of tunny and swordfish, and the Sweet Waters with a profusion of fresh-water fish.

**Communication.**—The communication by steamer with all the chief ports of the Mediterranean and Sea of Marmara may be considered as almost constant. Rail with all parts of Europe, via Adrianople; and from Haidar Pasha, on the Skutari side of the Bosphorus, to Ismid, Angora, Konia, and Eregli. There is a short subterranean railway up the steep incline from Galata to Pera; trains run every few minutes. Telegraphic communication with all parts by land line and cable.

Passenger steam vessels ply between the Golden Horn, Bosphorus, Marmara Islands, and the neighboring seaside villages.

Caiques of graceful appearance are constantly gliding about the Bosphorus; and their light, sharp, and swift build enable them easily to stem the currents, however strong or rapid. Their hire is moderate, and under all circumstances they are preferable to ships' boats.

**Coal and supplies.**—In normal times about 15,000 tons of coal was kept in stock at the various depots and was put on board lighters. There are special coaling buoys, and it is very rarely, even in severe southwesterly gales, that coaling is interrupted. There are

also coaling wharves having 7 fathoms alongside. If vessels coal at Therapia or Beikos Bay an extra charge is involved.

Every description of supplies can be procured, and there is a contract for supplying British naval vessels with fresh provisions, fresh water of very good quality being also supplied by the contractor at a reasonable rate.

**Docking and repairing.**—The naval port lies immediately above the western bridge, and to it particularly applies the name of the Golden Horn; ships of any draft can pass beyond the bridges. It is 800 yards in breadth and is reserved for the vessels of war, which anchor off the north quay, abreast of the naval arsenal, where they moor generally in 16 fathoms, mud. In the imperial dockyard there are steam hammers, and floating sheers that will lift 80 tons. The rolling and bending plant of the dockyard is used, when necessary, by the private firms who undertake repairs. The arsenal contains large stores for the fleet, stocks and slips for building and repairing ships, victualing magazines, steam sawmills, barracks for the officers and seamen, and a naval school.

Large repairs can be effected at the imperial dockyard and at the engineering works of private companies.

**Hospitals.**—The hospitals include the British Seamen's, situated in Rue Madresse, Galata, near the consulate general; German, Italian, and municipal hospitals; besides which there is a British Sailors' Home in Rue Djami, Galata.

**Stambul Liman.**—Above the Golden Horn lies Stambul Liman Reach, having a depth of 2 to 7 fathoms, extending as far as the village of Eyub, which stands on its right bank and near the Sultan's palace. It is to a mosque of this village that the Sultan comes to gird on the sword of Othman when he ascends the throne.

After passing the village of Eyub is the Kiaghat Basin, the boat channel to which is marked out by stakes, beginning abreast a large barrack on the right shore.

**Serai.**—At the eastern extremity of Constantinople, and facing the Bosphorus, lies the Old Seraglio, which occupies a large portion of the peninsula. It is of triangular form, and surrounded on its north, south, and west sides by high gray walls, which join those of the city. All the northern and most picturesque part of the Seraglio was burnt some years ago, and the extremity of the point is now bare, but the remainder of the ground is covered with buildings, everywhere relieved by clumps of cypresses.

The quay which skirts the eastern wall of the Seraglio on the Bosphorus is nearly  $\frac{3}{4}$  mile in length from north to south; and from the termination of the mud bank at Seraglio Point, its south extremity, where there are only 12 feet water 300 yards from the point, the shore is free from danger outside the distance of 200 yards, so that a

steam vessel may pass very close. The current at this spot sometimes attains a velocity of  $4\frac{1}{2}$  knots.

**Pera** stands, with the town of Galata and Topkhana, on the rising ground opposite Constantinople. Its houses are irregular and the streets narrow, and it is bounded by large cemeteries and promenades planted with cypresses.

It is at Pera that foreigners enjoy all their rights and privileges. They may possess houses and gardens and practice in perfect security the exercise of their creeds. The ambassadors of foreign powers reside there in magnificent palaces. The Turkish Government have also authorized the establishment of Christian churches, and it frequently happens that the voice of the muezzin from the top of the mosques, calling the faithful to prayer, is interrupted by the sound of the bell of a Christian church.

**Galata**, to the south of Pera, is an old town, built by the Genoese and formerly surrounded by an old loop-holed wall. Here merchants of all nations have established their offices and warehouses. Its lower part is a vast labyrinth of mud and filth, and fevers are always prevalent. The population consists of Armenians, Greeks, Jews, Maltese, Genoese, and the sailors of the numerous vessels which make fast alongside its quays.

Halfway up Galata Hill is a remarkable white round tower, which has the appearance of a large minaret. From its top the view embraces the Bosphorus and all Constantinople, and from thence the alarm is given in the frequent fires which devour the four adjacent towns.

Pera, Galata, and Topkhana appear as one town and occupy the whole face of the hill from the summit to the sea shore.

**Topkhana** lies eastward of Galata, along the bank of the Bosphorus, and faces the Old Seraglio and Skutari. It is a dull Turkish town, the greater part occupied by the Turkish Army, especially the artillery, who have a large park there and an exercising ground on the quay. Topkhana is to the army what the arsenal is to the navy.

A small bank extends 100 yards offshore, abreast the quay of Topkhana, but, being beacons off with piles, it is easily avoided.

Between Topkhana and Orta Kioi stands the palace of Dolma Bagche, which has been a frequent residence of the Sultan since the palace of the Old Seraglio was abandoned; and to the southwest of Dalma Bagche, near Fundukli, another palace has been erected, which borders the bank of the Bosphorus. All this part of the shore is covered with magnificent houses, besides the two large villages of Beshik Tash and Fundukli.

Further to the northeast is the marble palace of Cheraghan, another of the imperial residences, which, including the harem buildings, extend along the shore of the Bosphorus for nearly  $\frac{1}{2}$  mile.

**Anchorage.**—There is anchorage all along this shore in 10 to 17 fathoms, and vessels can either moor or remain at single anchor. Care should be taken not to anchor near the line, where the two currents meet, as they produce violent reaction, which sheer vessels in all directions and may cause collisions. Though it is easy to perceive on the surface of the water the boundary line which separates the permanent current from the eddies, it is varying its position from hour to hour, and if the anchorage is crowded, it is sometimes very difficult to avoid dropping the anchor near the dividing line. Vessels bringing up in the Bosphorus should therefore always moor. The holding ground is mud.

There is a berth with two mooring buoys for the use of His Majesty's ships to the eastward of the Topkhana Arsenal. As the stationnaires are moored very close to one another, it is advisable for vessels lying at these moorings in the winter months, and at all times when the weather is threatening, to be prepared to slip at short notice.

**Caution.**—Care must be taken with the cables both in anchoring and weighing, as there are many stray anchors on the bottom. Vessels are constantly running into or drifting on one another. A sharp lookout must be kept, therefore, in squally weather, especially on the smaller craft, which seem always to be at a short stay.

**Orta Kioi.**—Orta Point is easily distinguished by a white mosque on the extreme point. From the point a small spit projects about 30 yards, which would have been scarcely worth mentioning but that vessels usually hug that point.

Water may be obtained at Orta Kioi from a fountain which also supplies the population.

**Defterdar Burnu** (lat.  $41^{\circ} 2\frac{1}{2}'$  N., long.  $29^{\circ} 2'$  E.).—At Defterdar Point the central current is much weakened, and is often driven back by the countercurrent from Constantinople, which reaches as far as this point and then turns off into the general southwest current. Sailing vessels, however, frequently find it difficult to pass with light southerly winds, and, as at Arnaut Point, to the northward are obliged to warp round it.

**Duimi and Kuru Banks.**—About  $\frac{1}{2}$  mile northward of Defterdar Point are two banks, 300 yards apart, lying nearly parallel to the shore. Duimi, the southernmost, over which the depth is 3 feet, is 200 yards long north and south, 100 yards wide, and lies 100 yards from the shore. There is a depth of 7 to 10 fathoms between the bank and the shore, but no safe passage. Kuru Bank, formerly a shoal, with a depth of 4 feet, but now above water, is nearly the same size as Duimi, and lies abreast the village of Kuru Chesmeh, 200 yards from the shore. As there are depths of 7 to 12 fathoms between the bank and the quays, a vessel may pass inside it, though at all times it will be more prudent to keep outside, unless wishing to make fast to the



shore. The south extreme of Duimi Bank is marked by a lighthouse. On the northern end of Kuru Bank a large square house has been built, and the whole bank, or islet, is now occupied by a garden surrounded by a yellow wall. Vessels frequently make fast their hawsers and cables to these banks.

There is anchorage between the two banks, and generally many sailing vessels are at single anchor off here, waiting for a fair wind to get farther north.

**Duimi Bank Light**, flashing green, 23 feet above high water, visible 3 miles, is exhibited from an iron lamp post on a white house located between Defterdar and Chesme villages on the bank.

**Coast.**—Between Defterdar Point and Arnaut Point there is a zone of eddies setting northward, which sometimes, near the shore, are strong, but all of which turn off on reaching Arnaut Point and unite with the main current. Small vessels frequently land their crews and track round the point. There is anchorage under the point in 14 to 17 fathoms, sheltered from the current, but within 200 yards of the shore.

There are good anchorages off the quays of the different villages which stand on this shore, the largest of which is that of Kuru Chesmeh, near which is seen the palace of the Sultana Valideh.

**Bebek Bay**, between Arnaut Point and Rumili Hissar, is deep, and, as the current never enters it, would afford some facilities for navigating the Bosphorus were it not obstructed by a bank. This bank over which the depth is only from 3 to 6 feet, extends into the bay from abreast the quays on the north side of Arnaut Point about 600 yards to northeastward. Its termination is marked by a white stone pyramid, which also serves for warping.

**Bebek Light**, flashing green, 15 feet above high water, visible 3 miles, is exhibited from a white masonry pyramid located on the extremity of the bank.

**Rumili Hissar.**—The point of Rumili Hissar is overlooked by a hill, on which still stand some towers and an old fortified castle. It was from this point that Darius contemplated the passage of his army, and from this also the Goths and the Crusaders crossed into Asia. The conquering Turkish Army, under Mahomed II, also crossed into Europe here, immediately before the siege and fall of Constantinople.

**Telegraph cable.**—Cables are laid between Rumili Hissar and the opposite shore. Care should be taken not to anchor near the cables.

With light southerly winds vessels can run up to Rumili Hissar nearly as far as the castle, southward of which they can either make fast alongside the stone quay or anchor, in about 8 fathoms, very near the shore.

**Rumili Hissar Light**, flashing green, 36 feet above high water, visible 3 miles, is exhibited from a white iron column on a white square tower located on the wall of the fortress 110 yards from the guardhouse.

**Devils Current**.—In this part of the strait, which is only 800 yards wide, the current attains a velocity of 5 knots an hour, and is known as Devils Current.

**Balta Liman** is a small village nearly halfway between Rumili Hissar and Yeni Kioi. It gave its name to the treaty by which Russia agreed to enter the Danubian Provinces only in concert with Turkey and in case the population should rise in arms.

**Istenieh Bay**, small and of a circular form, is sheltered from all winds and currents. About 100 yards from its western side there is a depth of 5 fathoms, shoaling toward the shore. Its entrance is 200 yards wide, and although the bay has a depth of 6 to 14 fathoms, vessels seldom use it, but prefer working up in the eddy and anchoring under Kiobashi Point, the latter being a better berth from which to weigh.

There is a mooring buoy in the entrance to the bay.

**Kiobashi Point—Yeni-Kioi Bank** (lat.  $41^{\circ} 7' N.$ , long.  $29^{\circ} 4' E.$ ).—From this point a bank, having a depth of 5 fathoms on its outer edge, projects 300 yards from the shore. It begins northward of the point and borders the shore to the southward as far as Istenieh Bay; and on this bank, about 200 yards from Kiobashi Point and 125 yards from the shore, lies a sunken rock, having a depth of from 1 to 2 fathoms.

**Clearing mark**.—Rumuli Hissar Point, in range with Khanlijeh Point,  $201^{\circ}$ , leads outside Yeni-Kioi Bank.

**Anchorage**.—A flat extends 200 yards outside Yeni-Kioi Bank, on which vessels may anchor in 5 to 14 fathoms, sheltered from northerly winds, also from the channel current, which, by its divergenee from Kiobashi Point toward the coast of Asia, causes a countercurrent that runs nearly up to the point.

Two mooring buoys, for the use of the Austro-Hungarian stationaire in summer, are situated off Yeni-Kioi.

**Light**.—A white buoy, exhibiting a flashing green light 10 feet above the water, visible 3 miles, is moored on the edge of Yeni-Kioi Bank.

**Therapia Bay** is small, but sheltered from all winds. It has a depth of 6 to 9 fathoms, but accommodates only a few vessels, which generally make fast alongside the quays. A vessel entering must avoid being set to the southward, and should therefore hug as much as possible the northern shore, for the current, which is but slightly felt in the bay, sets toward a sunken rock off the little mole which forms

the southern entrance point; and shoal water also extends within the bay from its southern shore.

During summer nearly all the available space in this little bay is occupied by the stationnaires attached to the different embassies in Therapia. Vessels seeking temporary anchorage should anchor on the opposite shore, either in Beikos Bay or off Sultans Valley.

The summer residences of the French, English, and Italian ambassadors lie between Therapia Bay and Kirich Point, and are built near the broad quay that fronts the Bosphorus. The French palace, which is red in color, is the northernmost of the continuous line of houses north of Therapia Bay. The English one stands conspicuously by itself, at the point north of the French palace, and is white with a gray roof. The Italian palace stands on the quay southward of the French palace.

**Kiritch Burnu Light**, flashing green, 26 feet above high water, visible 3 miles, is exhibited from a mast on a white house located about  $\frac{1}{2}$  mile  $333^{\circ}$  from Therapa.

**Buyukdere Bay** is formed between Mezar and Kirich Points, in front of a magnificent valley. It affords shelter from all winds and is the best anchorage in the Bosphorus. The town occupies the north shore and contains the ordinary summer residences of the ambassadors, consuls, and rich merchants of Constantinople, who live there in magnificent villas. A smaller village, named Kechli Kioi, lies on the southwest shore, near the south minaret. The north minaret stands at the head of the bay.

**Anchorage.**—Vessels may anchor in any part of Buyukdere Bay, in 18 to 24 fathoms at its entrance, 10 to 12 fathoms in the middle, and in 4 to 7 fathoms at its head, over mud and fine sand, taking care to avoid a spit of 9 feet extending from 100 to 200 yards from the shore throughout the bay. The best and most convenient anchorage is about 600 yards southward of the town of Blyukdere, in about 8 fathoms, with the north minaret of Kechli Kioi bearing  $278^{\circ}$ . Vessels in picking up an anchorage often find so many craft riding in the bay that they can not choose a convenient berth.

**Current.**—The main current from Mezar Point increases in strength, and, passing Buyukdere Bay without entering it, sets directly on to the battery at Kirich Point, and also over Englishman Banks. Although the current does not enter the bay, yet there is always in it a weak eddy, which becomes very irregular and changeable when the current in the channel is strong, for it then sometimes sets up to Kirich Point, and to the northward of the village, and even beyond Mezar Point and Yeni Mahalleh; and it has been known to reach as far as Buyuk Bay in the zone where the water is generally slack.

**Quarantine.**—There is a pratique office here which is used only by sailing vessels.

**Patent slip.**—There is a patent slip in Buyukdere Bay with a cradle 154 feet long and having a lifting power of 450 tons. The depths over the cradle is 10 feet forward and 11 feet aft.

**Water supply.**—West of Buyukdere, in the forest of Belgrade, lie the reservoirs (or bends) which furnish Constantinople with water. These, with their aqueducts, were commenced by Constantine the Great, and have been added to and replaced by successive Emperors and Sultans.

The forest, principally composed of chestnuts and oaks, is the eastern portion of a vast wooded area stretching to the northwest. The part available for catching the water covers ground much broken and cut up into valleys, the lower ends of which, when dammed, form the reservoirs. Of late years the forest has been much reduced by want of care in preserving it from fires and the same lack of supervision has permitted the dams, aqueducts, and watercourses to fall out of repair. The solidity and magnificence of these works, built in some instances entirely of marble, attest that Sultans as well as Emperors fully recognized their immense importance.

The aqueduct of Ibrahim, which crossed the head of Buyukdere Valley and carries water into Pera, is visible from the Bosphorus and is the latest of their structures. It collects water from four bends near the village of Bagche Kioi, at the edge of the forest.

The Great bend is near the village of Belgrade, about 5 miles from Buyukdere, and well in the forest. A well macadamized road leads as far as the village.

Three other bends assist in the supply of Stambul, and their water is carried over the two magnificent aqueducts of Constantine and Suliman, near the village of Burgas, and that of Justinian farther southwest, and so round the head of the Golden Horn into the town.

**Mezar Burnu** is bordered by a shoal bank, which extends 100 yards seaward.

Northward of Mezar Point the coast forms a small bay, in which anchorage, free from the main current, may be obtained. Here are seen the villages of Sari-yar and Yeni Mahellah. Between these two places a small stream named Guldere empties into the sea.

**Telli Point.**—On Telli Point stands a ruined battery and a conspicuous yellow house.

**Rumili Kavak** is a small village in a pretty valley just opposite Kavak Point in Asia. On the hill above are the traces of an old Genoese Castle, and at the waterside is a small stone battery.

**Dikili Rocks.**—Abreast Rumili Kavak, and nearly 400 yards from the shore, lies a cluster of rocks, 200 yards long northeastward and southwestward, and 150 yards broad. The south end of Dikili Rocks

is a little north of a line joining the two large forts, which stand beneath the castles of Rumili Kavak and Anatoli Kavak. They are marked by an iron tripod beacon which is surmounted by a spherical cage. Some of the rocks are above water; others break in rough weather. A good lookout should always be kept for them, especially during the night, as they are very dangerous.

Between Dikili Rocks and the shore there is a passage having a depth of 9 to 13 fathoms.

A vessel may anchor near the southwest end of Dikili Rocks in 8 to 10 fathoms water. There is deep water within a short distance of the rocks.

**Telegraph Cable.**—A telegraph cable crosses the strait from Rumili Kavak to Kavak Point. Vessels should avoid anchoring in its vicinity.

**Coast.**—From Rumili Kavak the coast extends nearly in a straight line to Buyuk Bay and is bordered by a shoal bank, which extends about 125 yards into the strait, and in some places bordered by steep rocks, of considerable height, lying close to the shore. A weak current sets northward along this part of the coast.

**Buyuk Bay.**—In calm weather there is occasional anchorage between Rumili Kavak and Buyuk Bay, 300 yards, in 8 to 12 fathoms, but the best berth is southward of a powder magazine and a battery which stand on a hill forming the south point of the little Bay of Buyuk, to the head of which no large vessel can go, as there are only 11 feet water. A flat extends for upward of 400 yards into the channel from the northeast point of this bay, on the outer edge of which there is a depth of 5 fathoms.

**Karibjeh Point** (lat.  $41^{\circ} 12\frac{1}{2}'$  N., long.  $29^{\circ} 6\frac{1}{2}'$  E.).—The coast between Buyuk Bay and Karibjeh Point maintains the same character, and is fringed by the shoal bank before mentioned, and which extends 125 yards into the strait. On the outer edge of the bank there is a depth of 5 fathoms.

On Karibjeh Point is an antiquated stone castle, and on a hill projecting northeastward lies the large battery of Karibjeh, round which are seen a few barns and a small village.

The coast northward of Karibjeh Point forms a bight open to the northeast, and fringed by a shoal bank, in which the current generally sets northward, though weakly. In fine weather a vessel may anchor in this bight, 800 yards from the shore, in about 10 fathoms water.

**Papas Point.**—On a hill of moderate height named Papas Point, and southward of a little minaret, stands a battery.

**Cape Rumili**, on the northwest point of the European shore of the entrance of the Bosphorus, on which stands the lighthouse and the Greek village of Fanaraki, is surrounded by a belt of high rocks with steep faces, on one of which, named Kyani Island, is still seen the

remains of an altar dedicated to Cæsar Augustus. Two hundred yards eastward of the island there is a depth of only  $3\frac{3}{4}$  fathoms. A vessel may anchor during southwesterly winds in fine weather, or in a calm, 800 or 1,000 yards southeast of the island, in 15 fathoms, over mud bottom.

**Rumili Light**, fixed white, 190 feet above high water, visible 18 miles, is exhibited from a white circular stone tower located about 600 yards south of the battery.

**Fogsignal**.—The fogsignal is a siren.

#### ASIATIC SHORE.

**Skutari** (lat.  $41^{\circ} 1' N.$ , long.  $29^{\circ} 1' E.$ ).—The town of Skutari, or Uskudar, surrounded by numerous gardens and cypresses, stands on the Asiatic bank of the Bosphorus, opposite the entrance to the Golden Horn. Its streets are wider and offer a more lively appearance than those of Constantinople, and it is the rendezvous of caravans arriving from the center of Asia and the point of departure of those going to Mecca. The position is admirable, and the view finer than at Constantinople, especially from Mount Bulghurlu, which lies to the eastward of the town. Its population may be estimated at 35,000, of which the greater portion are employed in the production of silk. There is a telegraph station.

A vast cemetery lies at the back of the town called the Dead Quarter, which is equally used by the Turks of Constantinople. At Skutari water is obtained in abundance, and vessels lying at Constantinople are supplied during the warm season.

**Leander Tower**.—The seashore of Skutari is bordered by a sand flat which extends from 300 to 800 yards from the shore and on the outer edge of which there is a depth of 5 fathoms. At the extremity of a rocky ledge, extending 200 yards from the west point of Skutari, is a rock nearly awash, on which is built a square white tower, with a gallery, named Leander Tower, but locally known as Guz Couli (Maiden's Tower), at the foot of which is a small battery.

**Skutari Light**, flashing red, 36 feet above high water, visible 4 miles, is exhibited from a white iron column on wall near Leander Tower on the east side of the strait.

**Selimiyyeh Barracks**.—A short distance southward of Skutari stands Selimiyyeh Barracks, a large square yellow building, flanked by four towers at its angle.

Northeastward of Skutari are the two villages of Kusgunyuk and Istavros. Eastward of the latter, and near the shore, is the white marble palace of Beyler Bey.

The coast from Leander Tower to Kandilli Point is bold and has deep water within a few yards of the shore. This side of the channel

is rarely frequented by vessels going northward, as there are neither eddies nor anchorages, in case of calms or a sudden shift of wind. Southward of Kandilli, and in the little bay of Vanikioi, a narrow zone is found where the water is slack.

**Kandilli Bank.**—Off the point of Kandilli a shoal bank, on the outer edge of which there is a depth of 5 fathoms, extends 100 yards into the strait.

**Kandilli Point Light**, flashing red, 90 feet above high water, visible 4 miles, is exhibited from a white iron mast located near the extremity of the point.

**Anadolu Hissari.**—Between Kandilli and Anadolu Hissari is a bay, the shores of which are steep except near the latter place, where a fringing bank, with 9 feet of water, extends 100 yards into the strait.

At Anadolu Hissari an old Genoese castle is seen, which commands this part of the channel; also a pretty valley, through which runs a small stream named Ghiok Su, or the Sweet Waters of Asia, where a greater portion of the Turkish population of Constantinople, the women especially, assemble on Fridays to enjoy various amusements.

The two castles of Anadolu and Rumili Hissar, now in ruins, the latter on the European side, are situated at the narrowest part of the channel. The chief part of the northern maritime defenses of the capital was formerly concentrated here.

From Anadolu Hissari the coast trends nearly due north as far as Khanlijeh, when it trends eastward. Between the two places mentioned the water is always slack, of which advantage is taken in southerly winds.

**Khanlijeh Point Light**, flashing red, 82 feet above high water, visible 4 miles, is exhibited from a white iron column located 110 yards from the shore.

**Chibukli Bay.**—The little bay of Chibukli affords no good anchorage, owing to the great depth of water and being open to the strength of the current.

**Injir and Beikos Bays** offer a large and safe roadstead for a considerable number of vessels, sheltered from the influence of the main current, which, in crossing this great bight, is diverted into a zone of weak northern eddies within 800 yards of the shore. The village of Yali Kioi lies northward of Beikos, and that of Injir to the southward.

Vessels generally prefer the Bay of Beikos to that of Injir and anchor, in 18 to 26 fathoms, about 400 yards from the shore, abreast the villages of Yali Kioi and Beikos, whereas the anchorage off Injir is much obstructed by a mud flat, extending 600 yards from abreast the old minaret, and carrying only 6 to 15 feet, with some points of rocks

and ledges of gravel on its outer edge. Vessels should moor as taut as practicable, and great attention is necessary to keep the hawse clear.

The small bay off Sultans Valley lies between Selvi Burnu and the north point of Beikos Bay, on which stands an outpost of the health office. It has a depth of 7 to 12 fathoms, mud mixed with sand, and is fringed by a bank, extending 50 to 150 yards from shore, on the outer edge of which are 5 fathoms. The bay is named after that picturesque valley, which is studded with trees, and in which is seen a kiosk belonging to the Sultan. A little stream runs through the valley into the bay; but as the water is obtained with some difficulty, it is preferable to get it from Beikos, which offers more convenience, the water being brought alongside in water boats.

English naval vessels on this station sometimes moor in this bay, northeastward and southwestward, with 50 fathoms on each cable, in 8 to 10 fathoms, but the most sheltered anchorage is with Selvi Burnu bearing  $329^{\circ}$  900 yards, and the French ambassador's flagstaff at Therapia  $284^{\circ}$ .

**Selvi Burnu.**—The promontory of Selvi Burnu is likewise named Unkiar Skalessi, and a block of granite, in the form of a pyramid, has been raised there.

Selvi Burnu is fringed by a bank the outer edge of which has a depth of 5 fathoms and is 100 yards from the shore.

Between Injar Bay and Selvi Burnu the channel current is but little felt inshore, but there are generally slight eddies which will assist vessels in working to Selvi Burnu.

**Englishman or Umur Banks,** although lying in the widest part of the channel, are dangerous to the navigation of the Bosphorus on account of the current, which sweeps across them from Mezar Burnu. Their northeastern edge, of 3 fathoms, with 5 fathoms close-to, is 600 yards southwestward from the southern extreme of Mujue or Umur Point, the north extreme of Umur Bay. The northern edge of 5 fathoms lies northwestward 150 yards from this spot. There is also a small patch of 5 fathoms situated 350 yards southwest of Mujue Point.

From the northern edge of 5 fathoms the banks extend 1,800 yards in a southerly direction and terminate 500 yards northwestward of Selvi Burnu. Their breadth varies from 200 to 400 yards.

These shoals are separated by a channel running east and west, 150 yards in breadth from their edges in 5 fathoms, and having a depth of 6 to 13 fathoms water, but the channel can not be made use of, as the current sweeps across it. They thus form two distinct banks, of which the larger, sometimes named Selvi Bank, is to the southward and occupies two-thirds of the whole length. This bank has a depth of 6 to 18 feet over a bottom of sand and gravel with stones. The smaller and northern bank has 9 feet least water.



The water on Englishman Banks is often discolored.

**Buoys.**—The south and southwest sides of Selvi Bank are marked by red can buoys.

As vessels generally pass westward of Englishman Banks and round to at the south end, these bouys are most useful, as formerly vessels frequently grounded on the edge, when keeping close to the bank to avoid being swept down the Bosphorus.

**Caution.**—The buoys on Selvi Banks are not to be depended upon.

**Umar Bank (Englishman) Light**, flashing red, 26 feet above high water, visible 4 miles, is exhibited from an iron mast over a gray hut located on the southwest edge of the bank.

**Range marks.**—The Sultan's Kiosk, open to the southward of Selvi Burnu, bearing 123°, leads southward of Englishman Banks. The tall house on summit of ridge, in line with the right tangent of a conspicuous yellow house to the left of Telli Fort, bearing 24°, leads westward of the banks, and the tree near distant tall house bearing 16°, and just open of Bushy Peak leads eastward of the banks.

**Umur Bay**, in the mouth of which lie Englishman Banks, is about 1 mile long and about 550 yards wide and has a depth of 5 fathoms 50 yards from the shore. This bay, the quarantine ground for vessels arriving from the Black Sea, affords excellent and much frequented anchorage in the eddy current which there prevails, in 10 to 13 fathoms, mud, 300 yards from the shore.

**Madschiar Kalessi.**—Nearly  $\frac{1}{2}$  mile northward of Mujue Burnu stands the large fort of Madschiar Kalessi.

About  $\frac{1}{2}$  mile to the southeastward of Madschiar Kalessi rises a lofty hill of a round form, named Yusha Dag, Kusha Dag, or Giants Mountain, which serves as a mark for vessels from the Black Sea entering the channel in the daytime. Its sides are covered with vegetation, and on its summit stands a large white building.

**Madschiar Bank.**—About 300 yards northeast of Madschiar Kalessi, and extending 200 yards in that direction, lies a rocky bank, 150 yards long, having 5 fathoms on its outer edge and only 5 feet in the middle.

Vessels closing the coast of Asia, in coming from the northward, will avoid this bank by keeping the small battery or minaret, which lies a little southward of Kirich Point on the European shore, open westward of the west extreme of Madschiar Kalessi.

**Buoy.**—The northeast edge of this bank is marked by a red conical buoy.

**Major Bay.**—Between Madschiar Kalessi and Kavah Point a deep bay is formed, where the channel current is only slightly felt. The coast about this bay being high, causes calm with the winds from the southward and eastward. Vessels rarely anchor in it, there being 17

fathoms 200 yards from the shore, and when passing up the channel with a fair wind, they give it a wide berth to avoid baffling airs under the high land.

**Kavak Point.**—On this point is situated the fort of Kavak. It faces that of Rumili Kavak in Europe, from which it is distant nearly 1,200 yards. Behind this fort stands the castle of Anatoli Kalessi, an old Genoese building now in a bad state.

The health office of Anatoli Kavak is situated a short distance southward of Kavak Point.

**Kavak Point Light**, flashing red, 62 feet above high water, visible 4 miles, is exhibited from a mast on a white house located in the fort.

**Coast.**—Between Kavak Point and Fil Burnu the coast forms a deep bight, called Kechili Bay, having deep water close to the shore, except at its head, where a flat, having 1 to 5 fathoms of water, extends 200 yards from the shore. A weak eddy sets around this bay to the northward.

**Fil Burnu.**—On this point stands a battery built on a hill, extending to the westward.

The coast northward forms a small bay, which has a depth of 1 to 5 fathoms; and along the high land of Fil Burnu there are some rocks with steep edges, but they are close to the shore. From Fil Burnu to Anatoli Lighthouse the shore is studded with rocks, and although there is generally a depth of 5 to 12 fathoms 400 yards from the coast, yet the anchorage is bad on account of the currents.

**Poiras Point**, on which stands an old stone castle, faces that of Karibjeh in Europe.

**Anatoli Light**, alternating fixed and flashing red and white, 249 feet above high water, visible 20 miles, is located about 2 miles 124° from Rumili Light.

**Fogsignal.**—The fogsignal is made by gunfire.

## CHAPTER V.

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### BLACK SEA.

**The Black Sea** is said to have received its name from the Turks, who, being accustomed only to the navigation of the archipelago, where the numerous islands and their convenient ports afford many places of refuge in case of danger, found the traversing of such an open expanse of waters, subject to storms, very perilous, and accordingly they expressed their fears by the epithet "black." The Greeks, on the contrary, gave it the name of Euxine, or hospitable.

This sea, which divides the southern Provinces of Russia from Anatolia, or Asia Minor, lies between the parallels of  $41^{\circ}$  and  $46^{\circ} 30'$  N., and the meridians of  $27^{\circ} 30'$  and  $41^{\circ} 45'$  E. Its length, from Burghaz on the west coast to St. Nikolai on the east, is about 600 miles, and its greatest breadth from the Melen Su to Odessa is 330 miles; but it is much narrowed in the middle by the projecting peninsula of the Krimea, which reduces the breadth to 144 miles. It is bounded on the west by Turkey, Bulgaria, and Roumania; on the north by South Russia, including Bessarabia, Kherson, and Taurida; on the east by the Russian Provinces of Circassia and Trans-Caucasia; and on the south by Asia Minor; and it is connected with the Sea of Azov by the Strait of Kertch, and with the Grecian Archipelago and the Mediterranean by the Bosphorus, the Sea of Marmara, and the Dardanelles. By the first it receives the drainage of a part of southern Russia, and by the second it sends off the surplus waters which are not lost by evaporation. With the exception of the Yellow Sea, there is probably no portion of the ocean which receives the drainage of a greater extent of country than the Black Sea. As the area which drains into the Black Sea is of an irregular ovate form, and said to comprehend 960,000 square miles, while the surface area of the sea contains only 180,000, it follows that each square mile of its surface receives the drainage of  $5\frac{1}{2}$  square miles, which will account for the small degree of saltness of its waters. The specific gravity of the surface compared with that of fresh water is as 1,014 to 1,000. That of the Baltic is 1,004, while that of the water of the Atlantic is 1,026 to 1,000. The specific gravity of the bottom water close to the Bosphorus is 1,020.

The deepest water found in the Black Sea is 1,227 fathoms, near the parallel of  $43^{\circ}$  N. and on a line joining Capes Kerempeh and Khersonese. Soundings taken on the Caucasian coast show deep water of

about 1,000 fathoms 20 miles, and from 300 to 500 fathoms 10 miles from the shore.

Although the temperature of the surface waters of the Black Sea changes with the seasons, below 200 fathoms it is fairly constant at 48° F.

The shores of the Black Sea are varied in aspect, but are in most parts high. From Cape Rumili to Cape Kaliakra the shore is of moderate height, backed by mountains, mostly of picturesque appearance. The coast thence, including the delta of the Danube, is low, slightly increasing in height toward Krimea. This peninsula as also the coasts of Circassia, Armenia, and Anatolia are bordered by lofty mountains.

**Current.**—By far the greatest quantity of water is received into this sea at its northwestern corner, where the rivers Dniepr, Bug, Dniestr, and Danube fall into it. Most of the countries through which these rivers run are covered for three or four months of the year with snow; and in springtime all the moisture which has descended on them during the winter, and has been preserved in a solid state, suddenly dissolves and descends through the channels of the rivers with great velocity, producing a current running to the southward.

There is also an almost constant current from the Sea of Azov, the natural outpour from the Don and other rivers. It acquires its greatest strength in spring and autumn, and, with a strong east-north-easterly wind blowing, it attains a velocity of 5 knots in the narrows of Kertch Strait. It runs, however, fairly through.

The strong current which sets out of Kertch Strait takes a south-westerly direction along the coast of the Krimea. Westward of Cape Khersonese it spreads out in different directions. That to the northward, toward Eupatoria and Cape Tarkhan, bends to the westward, and meets the waters of the Dniepr, the Bug, and the Dniestr, which turn it away to the southward. A vessel, when between the western extremity of the Tendra Peninsula and Cape Fontana, but more particularly near the latter, will feel the influence of this current, which, uniting with the water which flows out of the Danube, forms a current of about 1 mile an hour toward the Bosphorus.

The accumulation of the waters toward this strait, especially with strong northerly winds, is so great that it is not able to carry off all of it, and a portion is pressed against the coast of Anatolia, where it gives rise to another current running to the eastward, and which makes its way along the coast of Asia and mingles with the waters of the Sakarieh, the Kizil, the Yeshil, and the Chorokh, which carry it on to the eastward between Anatolia and the Caucasus, where it meets with the Rion, the Kodori, and other rivers which add considerably to its strength. It then follows in a northwesterly direction the Caucasian

shore, receiving all the waters from the mountains and the River Kuban as far as the Strait of Kertch, where it completes, but only to commence anew, that circular movement which has been described.

Between Cape Khersonese and Kertch the strength of the south-westerly current setting along the coast of the Krimea will depend greatly on the state of the rivers flowing into the Sea of Azov and the direction of the wind. As in spring and autumn, and with strong northeast winds, the volume of water running out of Kertch Strait is much greater, thereby increasing the velocity of this current.

The westerly current, which sets along the Caucasian coast, increases in strength as it passes the Black Sea mouth of the Kuban, and meeting the stream from the Sea of Azov westward of Tuzla Bank and the sunken breakwater, causes a large deposit between them and the light-vessel. Thence the combined streams take a direction southwestward parallel to the coast to Cape Takil, thence westward along the coast of the Krimea.

On the Caucasian shore the coast current running to the northwest is much felt in the locality of Cape Kadosh. On the Anatolian coast, near Sinub (Sinope), the effects of a current running westerly as far as Cape Kerempeh have been experienced, extending only a short distance from the shore, but at a greater distance to seaward it sets to the eastward.

The different directions which have been thus ascribed to the Black Sea currents must not be taken as absolute on all occasions as they are sometimes influenced by the winds or by local circumstances. There are counter currents or eddies in the bay on the coasts of Rumelia and Bulgaria and also at a little distance from the shores of Anatolia.

For instance, in December, 1852, 13 vessels bound from Odessa to Varna were wrecked near Cape Shabler, and in March, 1855, 6 more between that cape and Mangalia when bound to Varna from the Krimea. As this loss may have been caused by an unusually strong current to the west or even northwest, the mariner should be on his guard against such an occurrence.

With a moderate gale from northeastward, an unmistakable set on to the coast and to the southward was experienced, amounting at first to only  $\frac{1}{2}$  knot, but getting stronger as the wind increased, and was such as might have caused the loss of many vessels had the coast lights not been seen. On the passage from Burghaz to Constantinople, with calms and light southerly winds, no current was experienced, which appears to point to the fact that the currents are greatly influenced by the prevailing wind. If southeasterly and southerly winds have been blowing for three or four days, a set of about  $\frac{1}{2}$  knot will be observed in a contrary direction.

With the exception of the indraft to the Bosphorus, the currents in the vicinity of the entrance are variable, being influenced by the prevailing wind, though, as a rule, they set to the eastward along the shore of Asia Minor, with a velocity of  $\frac{1}{2}$  to 1 knot.

**Winds and weather.**—The observation of several navigators establish approximately a line of demarcation from Cape Aia in the Krimea to Cape Kerempeh in Anatolia, thus dividing this sea into two parts—the western and the eastern. It is rare to pass this line without observing a change, and vessels that come up to it with a fair wind are often obliged suddenly to brace their yards sharp up. There is a second division, established by the direction of the winds, which divides the northern from the southern part of the Black Sea. This line, more vaguely marked, varies in the western basin from Cape Kaliakra to the mouths of the Danube; and in the eastern basin on the Caucasian coast, from Subeshik to Cape Idokopas, near Pshad. It will be obvious that these two lines of demarcation are much less observable in the open sea than they are near the shores.

On the west coast the two most dangerous winds that blow are from the south and southeast. They are uncommonly violent during the equinox and are the chief cause of the havoc committed in the Black Sea. The three great rivers—the Bug, Dniestr, and Danube—also bring large masses of water to the sea from opposite points of the compass; and if a south or southeast wind is blowing, produces the so-called “hacking” waves. These dangerous winds do not frequently occur in the summer, for a northerly wind blows almost without intermission at that season.

Southwest winds are strongest in spring and autumn and are dangerous on the Caucasian coasts.

A northeasterly wind brings with it clear weather and cold in winter. Northwesterly and westerly winds, on the contrary, are often accompanied by fog and moist weather. Toward the middle of summer the northerly wind is generally steady, and although at a later period it gives place to a southerly wind, it often reappears in January, and sometimes in February and March, and during all the spring. These remarks relate principally to the western portion of the Black Sea, which is subject to the influence of the Carpathian Mountains and the chain of the Balkan.

At Constantza it was noticed that from May to August the land and sea breezes were fairly regular, the sea breeze, between northeast and southeast, coming in about 9 a. m. and lasting till sunset, the land breeze, northwest to southwest, springing up about 3 a. m. and dying away about 8 a. m.

Occasionally during this period a strong northeasterly breeze was experienced, and at times strong westerly breezes accompanied by

rain, lightning, and thunder. A dull humid atmosphere gave notice of these thunderstorms.

In winter, gales which blow from north-northeastward to east generally commence more westward. A heavy swell, however, assures the sailor that the wind will shift.

On the north coast, in the spring and summer, the winds blow from northeast and southwest, sometimes very strong. In the autumn they are more variable. High winds cause a confused sea in Kherson Bay, but the effect in the River Bug is but slight. On the southern coast of the Crimea south or southeast winds seldom blow home; but there are exceptions to these general rules, and they are the more remarkable as they are invariably violent, which was proved in 1836 by the severe tempest, which occasioned the loss of several Russian ships of war and transports on the coast of Circassia, and the heavy gale of November 14, 1854, when several English transports were wrecked in Balaklava and Eupatoria Bays. Southerly gales are said to moderate after veering round to west and north.

In the neighborhood of Yalta it sometimes blows very hard from the northwest, and at Lampat the southwest wind often blows with violence through an opening formed by the Ayu Dag and the other mountains.

In the Sea of Azov the most prevalent winds are from the northwest. In the eastern portion of the Black Sea the influence of the lofty range of the Caucasus and of Asia Minor is felt, and it is a remarkable fact that the prevalent winds in winter on this coast, from Anapa to Subeshik, are those from the northwest, and from Subeshik to Mingrelia, from the southeast, although Subeshik forms no very prominent point on the coast. The northeast wind, by the violence with which it blows from the tops of the mountains, is said to come from "The Bed of Boreas," a term given by the ancient Greeks and which applies at the present day. The winds from the Anatolian shore are also, in many parts the strongest that blow there.

At Novorossisk the northeast winds, which are prevalent from the month of September to the beginning of April, sometimes blow with the fury of a hurricane, rushing down from the Varada Mountains with violence, and causing such a sea that vessels are driven on shore. These tempests are preceded by clear weather and by small white flaky clouds above the mountains.

It has been observed on the coast of Caucasus that west or southwest winds seldom blow home. Land winds from east and northeast prevail at night and sometimes are very fresh. Strong sea breezes generally haul round to the northward about sunset and lose their strength.

The coast of Asia Minor is rarely exposed to the violence of northerly winds. When they do occur they seldom blow home, being deflected toward east or west by the lofty range of mountains which extend in that direction throughout the country. Westerly winds are the most dangerous on the eastern part of the Anatolian coast, but north and northeast winds do not reach it, and easterly storms also are always light and the climate generally mild. The western part as far as the Bosphorus, on the contrary, is cold and chilly, and the winds from west to north and northeast are accompanied by storms of hurricane force, which occasion numerous shipwrecks and loss of life. Cape Kerempeh deserves the name of *Spartivento* (Separator of Winds), which has been given by the Italians to several capes in the Mediterranean, for a strife between the winds is often observed abreast of it.

During the month of May the western part of the Anatolian coast is sometimes visited with a gale from the north-northeast, which on one occasion caused the wreck of eight or nine vessels, but during the months of June, July, August, and September it is said to be perfectly safe.

At the entrance to the Bosphorus, during the summer months, from the beginning of April to November, the prevalent wind is from the northeast, with a fine clear atmosphere. Southwest winds prevail during the remainder of the year and blow sometimes with great violence in the months of December and January, the northeast gales being more frequently experienced in the months of September, October, and November.

**Winter buoyage.**—During the winter all buoys are replaced by spar buoys.

In the Black Sea it is the custom in November to remove the light-vessels and buoys in Kherson Bay, Kertch Strait, and the Sea of Azov, their positions being marked by spar buoys of the same color. When navigation is resumed in the spring (about April), the light-vessels and buoys are again laid out.

**Lights.**—During the winter, the shore lights of the Black Sea and Sea of Azov will cease to be lighted as soon as the whole visible horizon therefrom shall be covered with solid ice. The lights will again be exhibited as soon as open spaces are seen, or that the ice appears to begin to move. Should a vessel be seen at that time, even if the movement of the ice be arrested, the lights will not be discontinued unless the crew have abandoned the vessel and communication can not be effected.

**White fogs.**—In the Black Sea these fogs come on at times with inconceivable rapidity during calm weather, enveloping everything with a thick white vapor, through which nothing is visible. As the mist, however, occasionally rises to the top of the cliffs, and some-



times clears away altogether for a few moments, glimpses thus caught of the land, beacons, or whitewashed marks may give a knowledge of the vessel's position, obviating the necessity of vexatious delay on the part of a steamer and enabling a sailing vessel finding herself unexpectedly close to the shore to take all necessary precaution to avoid the danger.

From July to September is the period during which the white fogs are most frequently experienced, though they occur occasionally during the other months.

In time of fog, however, and during bad weather, when dense clouds hang about the hills in the background and the driving rain renders everything obscure, great caution is necessary on approaching the coast, as at those times there are some localities that bear a strange resemblance to the entrance of the Bosphorus, and if the land can not be seen the lead must be resorted to when, if proper care is taken, and due regard paid to the soundings, a good knowledge of the vessel's position can be arrived at, and the entrance steered for accordingly, when the fogsignals from Rumili and Anatoli will probably be heard.

**Ice.**—The winters are severe in the Black Sea, but more particularly on its northern shores, and it is recorded that in 401 A. D. it was entirely, and in 762 A. D. partially, frozen over. The month of December and the second half of January are often called the least dangerous of the season. Ice being more prevalent where water is shallow, and the salinity lowered by the discharge of rivers, the mouths of the Dneipr, the Dneistr, and sometimes those of the Danube, the port of Odessa, and the Strait of Kertch, where the water is all but fresh, are frozen every winter more or less. The ice seldom extends far to seaward, and often a southerly wind springs up and clears it all away with wonderful rapidity. It is rare, indeed, that the cold has been severe enough to leave traces of ice after the end of February. The time of its formation at Odessa is toward the end of December, and in the space of 20 years there were only three or four consecutive years in which this port was completely free of ice.

#### WESTERN SHORE; THE BOSPORUS TO ODESSA.

**Bosphorus Approach.**—At the northeast entrance to the Bosphorus the coast is of moderate height, but the landmarks on it, which serve to guide the navigator, are often enveloped in thick fogs, which are especially dangerous in these parts, so wanting in places of refuge that one mistake may cause a shipwreck. The entrance, nearly 2 miles wide, is marked by Rumili Lighthouse on the coast of Europe and by Anatoli Lighthouse on that of Asia. From Cape Rumili westward as far as Kilios the coast presents a very broken outline; small coves appear here and there, each with its little strip of white beach, bounded on either side by jutting rocky points. The shore is fringed

with cliffs and may be approached as close as  $\frac{1}{2}$  mile, 8 fathoms being obtained close to the rocks.

**Caution.**—The coast beyond Kara Burnu, which is 21 miles north-westward of Cape Rumili, bears a resemblance to the land in the vicinity of the Bosphorus, which circumstance has given it the name of the False Entrance, and the error in taking it for the true Bosphorus has caused the loss of many vessels.

The current in the approach to the Bosphorus, which sets to the southwestward during the prevalence of northeasterly winds, has been the cause of many vessels running ashore in Kilios Bay.

**Rocket, lifeboat, and refuge stations.**—This service, established at the Black Sea entrance to the Bosphorus, extends on the European coast from Cape Rumili to just beyond Mandre, 28 miles to the westward; and on the Asiatic side from Anatoli to Kilia Point, 21 miles to the eastward.

There are 80 men, 4 officers, 2 fireboats, and 19 rocket stations on the European side. The principal stations are cream colored, and the intermediate cement washed. There are 84 men, including officers, 2 lifeboats, and 18 rocket stations on the Asiatic side; the rocket houses on this side are painted white with black gable ends. The greater part of the stations on both sides stand on high ground and form good landmarks.

On the European side the lifeboat stations are at Kilios, about 3 miles west of Cape Rumili, and at Kara Burnu, 17 miles farther west. The stations where a rocket apparatus is kept are distributed along the coast, being rarely more than 2 miles apart. On the Asiatic side the lifeboat stations are near Riva Fort,  $2\frac{1}{4}$  miles east of Anatoli Lighthouse, and at Kilios Point, 19 miles farther east. The rocket stations and houses are situated at intervals along the coast, being about 1 mile apart when near the entrance to the Bosphorus, while eastward of Kara Burnu the distance is greater excepting at Kilia Point, where there are several rocket houses within a short distance of one another.

By day and by night the whole coast from Cheshmedjik to Kilia is watched by lookout men, and by patrol parties during a gale of wind or in thick snow or foggy weather. Shipmasters in position of danger or difficulty will, on all occasions, receive gratuitously advice or assistance from the officers and men of the Lifeboat and Rocket Service, who may easily be recognized by their uniform, which bears a distinctive badge on the coat collar.

**Landmarks.**—The cliffs in certain places on the Asiatic side are whitened, and thus afford an easily distinguishable mark to vessels approaching it. On the European side, between Kilios and Hissar Kaia, the red sands of Dumus Dere are visible in clear weather from a long distance seaward.

**Lightvessel.**—A lightvessel, exhibiting 2 fixed white lights 28 feet above the water, visible 9 miles, is stationed about  $14\frac{1}{2}$  miles north-east of Rumili Lighthouse.

**Fogsignal.**—The fogsignal is a siren.

**Coast.**—Uzunga Burnu, westward of which there is a rocket house, is the most projecting of the rocky points between Rumili and Kilios. This point forms the eastern side of the largest of several coves, open only to the northward, in which 3 fathoms are obtained 200 yards from shore. There is good landing for boats.

This is the most inviting spot in the vicinity in the event of having to run a disabled ship on shore as a last resource for saving life.

There is a rocket house and a rocket station between this point and Rumili Lighthouse.

**Kilios Point (Eski Fanaraki Burnu)** (lat.  $41^{\circ} 15' N.$ , long.  $29^{\circ} 2' E.$ ), situated about  $3\frac{1}{2}$  miles westward of Rumili Lighthouse, slopes gradually from a hill behind, terminating abruptly in a cliff, leaving a gap of a few yards wide between it and a large rock that at one time was evidently a portion of it.

**Village.**—The cliffs of the point continue for some little distance to the westward, meeting the sandy beach which stretches eastward from Hissar Kaiasi. On these cliffs stand an ancient castle and barracks for a small garrison. The Turkish village of Kilios is built on the slope behind the castle, so that but little of it is seen from the sea. This locality is well marked by three pillars of an ancient aqueduct, standing in the little bay to the westward, and which appear like the tall chimney of a factory.

A lifeboat and rocket station is established here from which telegraphic or telephonic messages can be sent to Constantinople.

**Telegraph cables.**—The Odessa and Constantza telegraph cables are landed in Kilios Bay.

**Kalaphotia Rock.**—In a north-northwesterly direction from Kilios Point, about 600 to 800 yards, is a rock, awash and steep-to, named Kalaphotia, after a Greek vessel that was lost there. The sea breaks in bad weather in a channel between it and Kilios Point, in which there is a depth of 5 fathoms. A patch of  $2\frac{1}{2}$  fathoms lies 100 yards northward of Kilios Point.

**Anchorage.**—The anchorage abreast the village of Kilios is in 3 or 4 fathoms, over a bottom of hard sand, 400 or 600 yards from the shore, sheltered from southerly and easterly winds.

In Kilios Bay, with a northerly wind, the sea immediately rises, and the whole bay is filled with breakers. The swell generally sets in before the wind, and vessels at anchor should stand out on the first indication of an approaching norther. There is a remarkable indication in Kilios Bay of the force with which the wind and sea beat in on the shore from the Black Sea, for the whole bight of the bay,

about 1 mile in extent, is covered with sand, which has evidently been flung up by the waves and carried by the wind over the low hills on the coast, which themselves were probably formed in this manner. These form such a marked contrast of color to the other parts of the coast that they may be seen at a considerable distance and are the best marks for recognizing the locality.

The depth of water at Kilios Point has been reported to vary from 3 to 5 feet according to the wind.

**Coast—Bank.**—Westward of Kilios a long sandy beach commences, backed by reddish hills, the summits of which are covered with verdure. This beach is broken only at Hissar Kaiasi and Kara Burnu, otherwise it is quite straight, tending  $303^{\circ}$  for 37 miles. It is faced by a sand bank, with a depth of 5 feet, 400 yards from the shore, upon which vessels disabled and desirous to beach are stranded and lost, if not carried over by the waves.

**Dumus Dere—Sand patches.**—The red sands of this valley, situated midway between Kilios and Hissar Kaiasi, form a good landmark for vessels making the entrance to the Bosphorus. There is a rocket house here.

Westward of Dumus Dere, and between it and Kara Burnu, are six other remarkable patches of red sand, the westernmost being situated  $1\frac{1}{2}$  miles westward of Ak Bunar Valley.

Each of these sand patches extends on both sides of the valley entrances in which they are situated, and from the offing appear double until the bottom of the valley becomes visible.

**Hissar Kaiasi**, a rocky point projecting slightly into the sea, has ground rising gradually behind it. On the summit of the point is a battery and a few houses stand on the western slope, hidden from the eastward. West of this point the beach again commences, and continues as far as Kara Burnu. There is a rocket station about  $\frac{3}{4}$  mile westward of Hissar Kaiasi, and rocket houses at Yali Tarla,  $1\frac{1}{2}$  miles, and at Molos,  $3\frac{1}{2}$  miles farther west.

**Reef.**—From Hissar Kaiasi Point a reef, about 100 yards in width, extends in the direction of Kilios Point 300 yards from the coast, the depth on which is from 6 to 13 feet. Between the reef and the shore the water deepens.

**Agatchili.**—A rocket station and refuge house is established at Agatchili, and there is a rocket house about 2 miles westward off it. The valley contains many houses and gardens, and a government farm is situated about 2 miles inland. Molos Valley, in which is situated the center sand patch of the seven patches mentioned above, lies 1 mile eastward of Agatchili.

**Ak Bunar and Kunduz** have each a rocket house. There is no village, but a refuge house at the latter. Two miles westward of Kunduz is another rocket house.

**Yeni Kioi**, situated on a height about  $1\frac{1}{2}$  miles westward from Kunduz, is conspicuous from seaward and has a rocket house.

**Kara Burnu**, situated 21 miles to the northwestward of Cape Rumili, is a broad headland stretching a considerable distance into the sea, forming a small bay on either side. It has a nearly perpendicular face and is steep-to, 20 fathoms being obtained about 200 yards from the shore.

**Lifeboat**.—In the bay to the eastward is the lifeboat house, and on the top of the headland a rocket station.

**Kara Burnu Light**, flashing white, 302 feet above high water, visible 24 miles, is exhibited from a white tower with a green cupola located on the edge of the cliff.

**Village**.—On the summit of the headland and on the eastern slope stands the small village of Kara Burnu, which is connected with Constantinople by telegraph. There are two ruined batteries situated on the cliffs to the northeast, in which a few old brass guns are mounted. From here there is a fair road all the way to Constantinople, which meets the telegraph wires at the village of Derkos (situated near the southeast end of the lake), and then runs along by their side the remainder of the distance.

**Coast**.—Westward of Kara Burnu, a high rocky coast continues as far as Kilidj Burnu, where there is a rocket house. Farther west, between the brushwood, are seen patches of sand, and the western part of this high coast, at Derkos Deresi, consists of a large patch of white sand destitute of all vegetation. This last patch is not visible from seaward, except a vessel is westward of the meridian of Kara Burnu.

**Lake Derkos (False Entrance)**, the locality of which has so frequently been mistaken for the entrance to the Bosphorus, is bounded to the southward by an irregular range of hills, which, bearing some resemblance to the winding self-closing banks of the Bosphorus, add greatly to its deceptive appearance in thick weather. It has been given the name of the False Entrance on account of the numerous mistakes occurring under the supposition that it is the true entrance of the Bosphorus, an error frequently resulting in shipwreck. Although the coast is lighted, the beacons which distinguished the different localities having been discontinued, care is necessary to guard against any mistake. Here is the outlet of the lake, the mouth of which is frequently closed during the summer months. Two ferries exist for the passage of this outlet, the one belonging to the Lifeboat and Rocket Service being near the shore and the other at the distance of  $\frac{3}{4}$  mile inland.

**Landmarks**.—The following remarks should assist the mariner in distinguishing between False Entrance (Lake Derkos) and the entrance to the Bosphorus:

1. False Entrance does not appear as a strait, except when seen from the northwestward, whilst the Bosphorus does not open until on a southwesterly bearing.

2. The seven red sand patches, previously mentioned, which form one of the principal marks for recognizing the western approach to the Bosphorus are situated east of False Entrance.

3. Should a mountain with two summits situated westward of Kara Burnu be mistaken for Alem Dagh or for Chatal Dagh (The Brothers), it is sufficient to recollect that the two latter are situated eastward of the Bosphorus, whilst the former is to the westward of the False Entrance.

Attention should also be paid to the soundings and the nature of the bottom.

**Cheshmedjik Point**, 3 miles westward of Derkos Deresi, which is steep and rocky and covered with brushwood and stunted trees, marks the commencement of the low hills, extending along the shore to the northwestward, which show a yellowish face seaward.

A reef of rocks extends about 300 yards from the shore, about 1 mile westward of Cheshmedjik.

**Refuge house and rocket stations.**—At Derkos Deresi there is a refuge house, and 1 mile farther westward is a rocket station. Cheshmedjik,  $2\frac{1}{2}$  miles westward of Derkos, in a small valley, has a rocket house; and at Mandre, 2 miles to the westward, is the westernmost rocket house on this coast.

**Orman.**—The country in the immediate vicinity of Lake Derkos shows no sign of cultivation, being covered with brushwood, arbutus, and scrub oak trees. The nearest village, Orman, is several miles inland, and has no communication with the sea. It is so named from its situation in a well-wooded country (Orman, meaning woods), and is of some importance, being the chief village of a large district and also a telegraph station.

**Cape Malatra**, 26 miles northwest of Karu Burnu, is steep, high, and rocky, but is not easy to distinguish from the offing.

**Chelengos Deresi**,  $2\frac{1}{2}$  miles southeast of Cape Malatra, is a small cove open to the northeast where a vessel of light draft might obtain anchorage with offshore winds, bottom sand and shell; but it is stated that better anchorage will be found at Kastro Deresi, 5 miles northwest of Chelengos, some protection from north and northeast winds being afforded by a rock situated close to the southward of the northern point of the cove, the anchorage, in 3 fathoms, being with the southern extremity of this rock bearing east-northeast, bottom sand.

**Serveh Burnu** (lat.  $41^{\circ} 40' N.$ , long.  $28^{\circ} 7' E.$ ), 32 miles northwestward of Kara Burnu and 52 from the Bosphorus, projects con-

siderably to the eastward and would afford shelter from northerly winds if the bottom were not bad and rocky. It is noticeable in appearance from its having rocky streaks of a reddish color on its slopes. A pyramidal rock is situated at the extremity of the cape, and a reef extends 300 yards in a southeasterly direction from it.

**Midiah.**—About 2 miles to the southward of Serveh Burnu is a steep cliff between the mouths of two small rivers, above which is built the small town of Midiah, where there is a telegraph station. A little creek about 100 yards in breadth is formed on its southern side, which serves as a shelter against northerly winds to small vessels that can anchor in from  $1\frac{1}{2}$  to 2 fathoms over a sandy bottom.

**Sandal Point**,  $4\frac{1}{2}$  miles northwest of Serveh Burnu, may be recognized by its white cliffs.

**Cape Kuri.**—Nearly 13 miles to the northward of Serveh Burnu is Cape Kuri, which is of moderate height, projecting to the southward. Its shores are sloping, of a yellowish appearance, and a clump of trees on its extremity, as well as the lighthouse, serves to distinguish it.

The depths in the immediate vicinity of the cape are very uneven. It should not be rounded within 400 yards.

**Cape Kuri Light**, group flashing white, visible 15 miles, is exhibited from a white masonry tower located near the extremity of the cape.

**Inada (Yniada) Road.**—Inada Point, the western angle of the promontory of which Cape Kuri forms a part, is bordered with rocks, and between it and the village and fort of that name, which lies  $2\frac{1}{2}$  miles to the westward, is Inada Road. A reef of rocks extends off in a southwesterly direction, 400 yards from a ruined tower, which stands nearly  $\frac{3}{4}$  mile northwestward of Inada Point on the northern shore of the road. There is a telegraph station at the village.

**Tersana Burnu.**—This cliff, situated about  $\frac{1}{2}$  mile southward of Inada village, is remarkable on account of the whiteness of its rocks.

On its northern slope is a large warehouse, and farther to the northward are several buildings and an isolated tree.

**Anchorage.**—A vessel in approaching the road with a northerly wind should keep close round Cape Kuri and Inada Point, as the wind will fail inside, taking care to avoid the rocks off these points and off the ruined tower. The best anchorage is west-southwestward of the tower, about  $\frac{3}{4}$  mile from the shore, in 6 to 7 fathoms, over a bottom of sand with fair holding ground, with Inada Point bearing  $98^\circ$ ,  $1\frac{1}{2}$  miles. There is a depth of from 3 to 4 fathoms about 800 yards from the head of the bay. If making a long stay, vessels should lift their anchors from time to time, otherwise they become so deeply embedded that it is difficult to weigh them.

Vessels very often visit this roadstead, particularly in autumn and winter, to allow the bad weather to pass; and although it has afforded security to many, yet the sudden changes of wind to which it is subject have been occasionally the cause of shipwrecks. Here, as all along the coast, the winds veer toward the shore every night. A heavy swell sets in at times, which causes vessels to roll very heavily, and then an eddy sets strongly toward the cape. At the bottom of the road there is a beach. The usual landing place for boats is at the quay near Inada.

**Cape Stefano** lies 4 miles to the northward of Cape Kuri and projects very little to the eastward.

**Agathopoli.**—About 15 miles to the northward of Cape Kuri is the little town of Agathopoli, named by the Turks Ak Teboli, from which Mount Paphia, one of the most remarkable mountains on the coast of Rumelia, bears  $284^{\circ}$ , 4 miles. A small cove lies to the southward of the town, formed by two points, on the northernmost of which stands the town, about 52 feet above the water, which is recognizable from a distance by the windmills in its neighborhood. The point to the southward is about half that height. The entrance to the cove, a little more than 100 yards wide, is between a reef of rocks which borders the northern point and the southern point, which is bold to approach. Most of the rocks are visible and appear as large as buoys above the water, the greatest depth in the channel being about  $4\frac{1}{2}$  fathoms. Fresh provisions can be obtained at the town. There is a telegraph station.

**Anchorage.**—On entering the cove a solitary building, which is a church dedicated to St. Constantine, is seen a little to the southward of the southern point. The anchorage is in about 4 fathoms, over a sandy bottom, sheltered from all but easterly winds, which can be avoided by approaching nearer the town and securing the vessel's stern to the shore, which is composed of shingle.

**Basiliko (Vasiliko) Harbor** (lat.  $42^{\circ} 10' N.$ , long.  $27^{\circ} 54' E.$ ).—The little harbor of Basiliko lies about 5 miles  $329^{\circ}$  of Agathopoli and about 2 miles eastward of a mountain to the northward of Mount Paphia. On the southern point of the harbor stands the village and mills. To the eastward of it, about  $\frac{1}{2}$  mile from the shore, are several rocks rising a few feet above the water.

**Anchorage.**—The entrance to the harbor is about 600 yards wide, and is formed between a reef which extends off the northern point and the point to the southward on which stands the village. A vessel will find 6 fathoms at the entrance and should keep the point of the village aboard and anchor to the westward of it, about 100 yards from the shore, in 3 to 4 fathoms, over a good holding ground of sand, sheltered nearly from all winds. In the other parts of the harbor



the holding ground is not good, being composed of sand and flat stones, over which the anchors are liable to drag.

The best place for landing is on the northern side of the bay, where the inhabitants haul up their boats.

**Kara Agatch Cove.**—The anchorage at Kara Agatch is in a small cove 5 miles northwest of Basiliko. The entrance to it is southward of a long and wide reef, which extends from the northern point for  $\frac{3}{4}$  mile in a southeasterly direction, with a depth of 12 to 14 fathoms between its extremity and the southern point of the cove. The approach to this roadstead, which is, however, but little frequented, is from the southward, and a vessel should keep the western shore on board before standing for the anchorage, which is in the northern part of the cove, in about 4 fathoms, abreast of a river and well sheltered.

**Cape Kara Agatch**, the northern point of Kara Agatch Cove, is easily distinguishable from the other points in its neighborhood, being white and steep and having on its summit a clump of large trees. The southern frontier of Eastern Rumelia comes down to the coast between Cape Kara Agatch and Athanatos Point.

**Athanatos Bay.**—About  $1\frac{1}{2}$  miles to the northward of Kara Agatch Cove is a small bay, open to the eastward. It is formed by two points bearing nearly north and south from each other,  $1\frac{1}{2}$  miles apart, and carries a depth of from 4 to 8 fathoms over a sandy bottom. Athanatos, the southern point, has a reef extending from it for more than 300 yards to the northward, with a few of the rocks above water. Zunaritsa, the northern point, has a similar reef running out about the same distance south-southeastward.

**Anchorage.**—A vessel proceeding to anchor in the southern part of this bay should, on opening out the little bight formed between the cliffs to the westward of Athanatos Point, steer for it when it bears due south. There is room here for five or six vessels, in about 4 fathoms, if they secure their sterns to the shore. A creek, about 130 feet wide, forms part of this bight, the entrance into which is only large enough to admit a small vessel, but there is space enough inside for three or four vessels drawing 16 feet water.

There is anchorage in the northern part of the bay, in about 4 fathoms, with the vessel's stern secured to the shore, between the reef which extends off Zunaritsa Point and the beach which borders the northern shore. The sea sometimes sets in when it is blowing fresh from the southeastward, but the wind does not blow home. Care must be taken in approaching this anchorage to avoid a long flat shelf of sunken rocks, which extends off to the southward, from the second prominence to the westward of Zunaritsa Point. A vessel, therefore, after passing to the southward of the reef off Zunaritsa Point, should continue on to the westward, and only haul up when the end of the

beach bears northwest. There is a rivulet in the northwest part of the bay, which collects its waters in the plain, but it barely finds a passage to the sea at the foot of the heights.

**Cape Zeitin**, 3 miles northeastward from Zunaritsa Point, which is high and steep, projects considerably to the eastward and should not be approached within  $\frac{1}{4}$  mile, as it is bordered with rocks. Baghlar Point (Cape Korakas) lies 2 miles to the northward of Cape Zeitin and is safe to approach.

In the bay south of Cape Zeitin the bottom is rocky in places, making it unsuitable for anchorage.

**The Gulf of Burghaz (Pyrgos)** is the only part of the Black Sea which affords several good anchorages. Its two extremities are Baghlar Point, to the southward, and Cape Emineh, to the northward, bearing from each other  $64^{\circ}$  and  $199^{\circ}$ , distant 22 miles. The town of Burghaz lies at the bottom of the gulf.

Burghaz Gulf, with the exception of Chingani Bay, has no watering place, and its northern side, being incommoded by extensive shoal water and by several insulated patches of rock and foul ground, affords no anchorage for a fleet.

**Kavak Bay.**—About  $1\frac{1}{2}$  miles to the southeastward of Sizepoli, a tongue of land, nearly 1 mile in length, forms the north extremity of Kavak Bay. In the northwestern angle of this bay several copious springs rise out of a bed of loose sand about 400 yards from the shore. These when united would form a stream at which vessels, by sinking casks, could obtain a supply of excellent water, clear as crystal and of high repute for its wholesome quality. The spot is well indicated by circular clumps of trees at the sources of the springs.

**Anchorage.**—There is good summer anchorage off this bay for a fleet,  $1\frac{1}{2}$  miles from the springs, in 18 to 20 fathoms on mud. The coast of the bay appears to be bold, except about 400 yards south of the southeast point of the tongue, where there are some rocks above water. Large vessels should anchor with this point bearing to the westward of north.

**Sizepoli (Cape Pribachi).**—This town, on the south side of the gulf, is built on a peninsula projecting  $\frac{3}{4}$  mile to the northeastward and is about  $\frac{1}{4}$  mile wide. It contains from 3,000 to 4,000 population, nearly all of whom are Greeks. The climate is healthy. The town is joined to the mainland, which is high, by a low and narrow isthmus. Bakirli, an isolated mountain, of a round form, serves as a landmark for making Sizepoli, from which it is distant about 6 miles. There is a telegraph station at Sizepoli.

**Port.**—A small island, of a triangular shape, named Ayios Petros, or Joannes, lies about 300 yards westward of Sizepoli, and forms, between it and the peninsula, a little port of about 200 yards in length

and the same in breadth. The entrance is from the northward and is much narrowed by rocks, which leave near the island a passage of from 40 to 46 feet in breadth, which will only admit vessels of light draft. They anchor in 2 to 2½ fathoms over a sandy bottom and are quite safe. This port has no outlet to the southward, as a bar of sunken rocks runs across it with only 3 to 4 feet water over them. There is a well of very good water on the island, but the large well, 33 feet deep, which supplies the town, would not be convenient for ships, even if it could afford a sufficient quantity for both such demands.

**Supplies.**—Beef, mutton, and fowls could be obtained, also bread of fair quality, at a moderate price. Vegetables are cheap.

**Sizepoli Bay**, to the westward of the peninsula, is of a semi-circular form, about 2 miles wide and 1½ miles long.

**Megalo Nisi, or Kyrios**, a small island, about ½ mile in length from east to west, lies about that distance to the northward of Sizepoli, forming thus two passages into the bay. A vessel in taking the passage between the island and the town, which carries a depth in the middle of about 10 fathoms, should give the small islet of St. Peter, which is connected to the eastern end of Megalo Nisi by a reef, a berth of 200 yards, and also take care to avoid the shoal of 1½ fathoms lying about 400 yards southwest of Megalo Nisi. The channel north of Megalo Nisi is much the wider and has a depth of 11 to 13 fathoms in the middle.

**Burghaz Bay Light**, group flashing white, 143 feet above high water, visible 18 miles, is exhibited from a white concrete tower located on Megalo Nisi Island, west side of entrance to Sizepoli.

**Anchorage.**—The best and most sheltered anchorage in Sizepoli Bay is in the southeast part, in 6 to 7 fathoms, opposite a ravine in the cliff, where there is a coal depot, with the west extreme of Ayios Petros Island touching St. Peters-Islet, or in less water farther in, if desired.

In the eastern part, about 500 yards west of the isthmus and southward of Ayios Petros Island, there is a shoal with 3 feet on it.

**Cape Trias, or Kavos Svitera**, is a small peninsula forming the western point of Sizepoli Bay. Foul ground extends nearly 350 yards eastward of it.

**Winds.**—In Sizepoli Bay, in ordinary weather, as elsewhere in the Gulf of Burghaz, toward midnight the wind rises from the north-westward, freshens until sunrise, and falls toward noon, veering through northeast to southeast. In the afternoon it freshens from this last direction and falls toward sunset, veering through south and west to northwest.

**Cape Nikolo**, about  $1\frac{1}{2}$  miles to the northward of Cape Trias, is bold to approach. A bay is formed between it and Cape Akin, which lies  $1\frac{1}{2}$  miles  $306^\circ$ , but vessels seldom anchor in it although it carries a convenient depth from 7 to 9 fathoms, as it is open to the northeast. A rocky spit runs off nearly 400 yards northeastward from Cape Akin, on which are several rocks above water, with a depth of 8 fathoms between them and the cape.

**Cape Sarleati, or Monopetra Athia Kavo**, which may be easily distinguished by an isolated round wooded hill that rises  $\frac{1}{2}$  mile south of its extremity, bears about  $284^\circ$  2 miles from Cape Akin, and is bordered by a reef above water, forming, with the latter cape, a bay of about 1 mile in length, open to the northward. It affords safe shelter from southeasterly winds in 5 to 9 fathoms over a bottom of sand. Care must be taken to avoid a 9-foot shoal in the western part.

**Anastatia Island.**—About  $1\frac{1}{2}$  miles  $284^\circ$  of Monopetra Point is Anastatia or Papas Island. It is small, and shallow ground encircles it for a short distance, with some dry rocks close off the south end. A lighthouse, convent, and a mill stand on the island. The landing place is on the southwestern side.

**Light.**—A fixed whitelight, 69 feet above high water, visible 10 miles, is exhibited from a white concrete tower located on Anastatia Island.

**Sukala Point** lies  $\frac{3}{4}$  mile southwest of Anastatia Island, between which and Monopetra Point is another curved bay, affording good anchorage, in 5 to 8 fathoms water, sand, and mud. Off Sukala Point a reef extends a short distance, and a shoal, with 4 feet of water over it, lies in the western part of the bay.

**Chingani Bay.**—To the westward of Sukala Point is the excellent bay of Chingani, or Katsevelo Scala, about 2 miles long and sheltered from all winds. Vessels that seek shelter in the Gulf of Burghaz generally anchor in this bay, which is capable of berthing a large number of vessels. The greatest depth is about 8 fathoms, with 2 to 3 fathoms near the shore, over a bottom of mud, good holding ground. Small vessels that load with wine anchor close to the shore, near a rivulet at the bottom of the bay, where there are some booths and storehouses, which are, however, abandoned in winter. This landing place is named Chingani. A little to the westward there is another rivulet, which, carrying a great deal of mud into the sea, has formed a bank, with  $1\frac{1}{2}$  fathoms about 400 yards from the shore.

**Quarantine.**—A quarantine station has been established close to the shore in a small cove on the west side of Chingani Bay. It consists of seven houses and a pair. There is a flagstaff in front of the houses.

**Poros Bay.**—Poros Point, the western point of Chingani Bay, is bordered by a rocky shoal, which extends about 400 yards to the northward. Close westward of it is situated Poros Bay, of about 1 mile long, having  $4\frac{1}{2}$  to 5 fathoms at its entrance, which is open to the northward. Within the entrance the bay shoals rapidly, and a mud flat, which dries, extends nearly  $\frac{1}{2}$  mile from its head.

As at Chingani, the country vessels that remain here during the bad season lie on the mud near the shore. There is a channel at the southern part of the bay, with 3 to 18 feet in it, leading to a passage carrying a depth of 2 to  $2\frac{1}{2}$  fathoms, which serves as an outlet to a large lagoon, or liman, named Akrianu Geul.

**Burghaz Bay.**—The western shore of Burghaz Bay, which is low, sandy, and covered with reeds, extends to the northward as far as the base of the high land on which the town of Burghaz, or Pyrgos, stands. At the northern end of this shore or spit, which separates the bay from Burghaz Liman or Muris Geul (which is about 5 miles in length from east to west and 2 miles in breadth), the beach is only 200 yards across.

The town contains about 13,000 population. The climate is unhealthy in summer.

The surrounding country is very fertile, and in the neighborhood are copper mines which were formerly worked.

Since the opening of the Yamboli-Burghaz Railway, which connects the town with the main line between Constantinople and Philippopolis, and the coming in force of a commercial treaty between Great Britain and Bulgaria, the import trade has greatly increased.

On the sand drive near Muris Channel, about  $\frac{3}{4}$  mile westward of the stone turret in the town of Burghaz, stands a windmill very distinctly visible from seaward.

**Communication.**—There is railway communication, via Yamboli, with Tirnova, on the main line between Constantinople and Philippopolis; also telegraphic communication with all parts. The Turkish steamers and a small Greek steamer ply regularly between Constantinople, Burghaz, and Varna, and occasionally to Constantza.

The steamers from London call regularly.

**Coal and supplies.**—From 500 to 1,000 tons of Turkish coal was in normal times usually in stock. Fresh provisions could be obtained at reasonable prices.

**Hospital.**—There is a public hospital with 32 beds.

**Harbor.**—The harbor of Burghaz is formed by two breakwaters. The eastern one, starting from the southeast corner of the town, extends in a southeast by south and southerly direction for 1,220 yards. The western one, which commences at Orchard Point, extends in a south-southeasterly direction for 780 yards, then easterly for about 750 yards. A short arm extends from the eastern toward the western

breakwater, leaving a passage a little over 200 yards in width. Two wharves are proposed to be built in the western part of the harbor, and the eastern portion of the inclosed area has been dredged to a depth of 24 feet. There is a small patch of 22 feet of water 200 yards to the southward of the western breakwater end.

**Lights.**—A fixed light, 34 feet above high water, is exhibited from a small dark gray cylindrical iron tower located at the entrance to the port on the head of the west breakwater.

A fixed red light, 34 feet above high water, is exhibited from a small dark gray cylindrical iron tower located at the entrance to the port on the head of the short arm extending west from the eastern breakwater.

An occulting white light, 49 feet above high water, visible 12 miles, is located on the head of the east breakwater.

**Fogsignal.**—A fog bell located at the southern extremity of the eastern breakwater is the fogsignal.

**Burghaz Shoals.**—Burghaz Shoals are numerous detached rocky banks to the eastward of the town and harbor; the outermost, with  $3\frac{1}{2}$  fathoms least water, lying about 2,200 yards  $81^\circ$  from the eastern breakwater light. Between this shoal and the shore there are several patches of between 2 and 3 fathoms water. Daghutli Peak in range with the Tumulus  $21^\circ$ , leads eastward of the reef.

**Anchorage.**—Burghaz Bay is open to the eastward. Winds from that quarter throw in a heavy swell and short sea, and shelter must be sought in the southern bays if it should blow hard from that quarter.

**Buoy.**—A mooring buoy is situated 1,700 yards  $191^\circ$  from the western minaret in the town.

**Akhilu.**—The town of Akhilu or Ankhelu,  $70^\circ$ ,  $8\frac{1}{2}$  miles from Burghaz, stands on a rocky point connected to the mainland by a tongue of sand, on which are salt pans communicating with Ankhelu Geul, which lies northward of the town. The point is surrounded by a reef, which extends nearly  $\frac{3}{4}$  mile in a southeast direction to the depth of 5 fathoms, and  $1\frac{1}{2}$  miles in a northeast direction to the same depth. The former is named the Southeast Ankhelu Reef, and the latter Northeast Ankhelu Reef.

**Communication.**—The steamers of a Turkish company running between Constantinople and Varna touch here. There is a telegraph station.

**Supplies.**—Bread and fresh provisions could in normal times be obtained. The principal articles of export are grain, salt, and wine.

**Anchorage.**—There is safe anchorage in the western part of the bight to the westward of the town of Akhilu with northeasterly winds, in 4 to 5 fathoms, over a bottom of sand, 400 or 600 yards from the shore. A 3-fathom spit extends nearly 1 mile to west-southwestward from the eastern shore of this bight. The outer anchorage to the

southwestward has from 6 to 7 fathoms, over sand and mud, but with easterly or southeasterly winds vessels must run for shelter either to Poros or Chingani Bays.

**Shoals.**—The coast between Burghaz and Akhilu forms a large bight, in and near which are the following shoals:

**Blonde or Burghaz Rock**, situated  $2\frac{1}{4}$  miles  $70^\circ$  from Burghaz Point, carries a depth of  $4\frac{1}{2}$  fathoms. Muris Dagb Peak, open southward of Burghaz Point  $253^\circ$ , leads close southward of the rock. Some rocky patches, named the Soka Shoals, having from  $1\frac{1}{2}$  to 3 fathoms over them, lie about  $3\frac{1}{2}$  miles northeastward of Burghaz Point, in the northwest part of the gulf. Their outer edge, in 4 fathoms, is 1 mile from the shore.

**Lakanathes Rock**, having only 3 fathoms over it, is 1 mile  $146^\circ$  of Akroteri Point, on the northern shore of the gulf. Another rocky patch of 2 fathoms lies 800 yards south of the same point.

**Spitfire Rock**, situated  $4\frac{1}{2}$  miles  $81^\circ$  from Burghaz Point, has a depth of 3 fathoms, with 6 fathoms close to its western side. Cape Emineh, open to the eastward of Akhilu Point  $57^\circ$ , leads eastward of the rock.

**Stavro Rock** lies about  $2\frac{1}{2}$  miles  $199^\circ$  from Akhilu Point and 3 miles east from Spitfire Rock. Akhilu minaret, on with the high peak on the Balkan range  $8^\circ$ , leads over its shoalest part in 15 feet.

**Ankhelu Bank.**—The middle of a rocky bank named Ankhelu lies about  $1\frac{1}{2}$  miles  $222^\circ$  of Akhilu Point. It is about  $\frac{1}{2}$  mile in length from north to south and from 400 to 600 yards in breadth, with a depth of  $3\frac{1}{2}$  to 5 fathoms on it.

**Crescent Shoal**, of  $4\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms, is  $1\frac{1}{2}$  miles to the eastward of the Ankhelu Bank. A sandy patch of 5 fathoms lies  $\frac{1}{2}$  mile to the southward of this shoal.

**Coast—Rhavtha Burnu.**—From Akhilu Point the coast runs northward for  $4\frac{1}{2}$  miles, and then bends round eastward to Rhavtha Burnu, forming a large bay  $1\frac{1}{2}$  miles long. Several rocky patches exist in this bay.

**Chemose Rocks**, nearly in the middle of the bay and about  $\frac{3}{4}$  mile from the shore, have from  $3\frac{1}{2}$  to 5 fathoms on them.

**Rhavtha Rock**, on which the depth is 3 fathoms, lies nearly  $\frac{3}{4}$  mile south-southwestward of Rhavtha Point. The western extreme of the town of Messemvria, open of Kavo Kroti  $53^\circ$ , leads 500 yards eastward of the rock. Rhavtha Burnu lies about  $\frac{1}{2}$  mile to the southward of the village of Rhavtha and is bordered by a rocky reef extending  $\frac{1}{4}$  mile from the shore.

**Water.**—A summer watering place for a fleet will be found at the Chemose River, which flows into the sea between Messemvria and Akhilu, near the hamlet of Chemose. It is next in size to the Kamchy and is said to run all the summer. Both these rivers are very turbid

at this season, but the quality of the water is considered to be not affected by the discoloring sediment. Launches can approach close to the Chemose and water from it with convenience.

**Anchorage.**—There is anchorage off Chemose during the summer season in 12 fathoms on a muddy bottom, but not nearer the mouth of the river than 2 miles for a fleet, owing to the several shoals which contract the inner anchorage.

**Kavo Kroti.**—From Rhavtha Burnu the coast trends to the north-eastward as far as Messemvria Point,  $3\frac{1}{4}$  miles. Nearly midway between them is a steep rocky point, named Kavo Kroti, westward of which a reef extends for nearly  $\frac{1}{2}$  mile from the shore.

**Messemvria** (lat.  $42^{\circ} 40\frac{1}{2}'$  N., long.  $27^{\circ} 47'$  E.).—This town, like that of Akhilu, occupies the whole rock on which it is built and is connected to the mainland by a narrow isthmus of sand, which is sometimes covered by the sea. The rock is nearly surrounded by a reef, which extends from it nearly  $\frac{1}{2}$  mile to the southeastward, and is about the same distance in breadth.

The town contains many ruined Byzantine churches, testifying to its former importance, also one mosque. The population numbers about 1,000. There is a telegraph station. Fresh meat, poultry, and vegetables could in normal times be obtained in small quantities only.

**Anchorage.**—The anchorage, to the southward of the town, is abreast of the isthmus in a small bay, in 5 to 8 fathoms, 800 yards from the shore, over a bottom of sand and shells. There is anchorage also to the northward of the isthmus, in about 7 fathoms, but vessels are here exposed to the squalls which during northerly winds blow violently from Mount Emineh.

**Coast.**—From Messemvria the shore becomes sandy and curves to the northward about 3 miles, when it bends abruptly to the eastward and runs in a straight line for nearly 8 miles to Cape Emineh, forming a large bay, which affords very good anchorage all over it in from 10 to 12 fathoms. It is open from east to south, and vessels that run in for shelter generally anchor in its western part, which is called Karidies.

On this part of the coast advantage should be taken of the north-west wind, which sometimes precedes a north-northeasterly or easterly gale in the winter months, to gain an offing, unless an anchorage can be secured, a heavy swell generally giving notice that the wind is about to shift. Should the vessel be between Cape Emineh and the Bosphorus she may reach shelter at Inada Road before thick weather comes on.

**Cape Emineh** is a bold-looking headland, with a monastery on it dedicated to St. Nicholas. From the southward it appears as an island. A few rocks extend about 400 yards eastward of it, and a depth of 5 fathoms will be found  $\frac{1}{2}$  mile from the shore.



Mount Emineh, a rounded mountain, which rises to a height of 1,257 feet,  $1\frac{1}{4}$  miles within the extremity of the cape, forms a conspicuous landmark.

**Cape Emineh Light**, flashing white, 207 feet above high water, visible 20 miles, is exhibited from a white tower located 6 yards from the extremity of the cape.

**Water.**—The coast under the cape affords no watering place after July, as the only streamlet which flows from the Balkan to this part of the coast is then insignificant, if not quite lost in the upper part of the valley. This streamlet descends through the first ravine to the westward of Cape Emineh, about 2 miles from it.

**Anchorage.**—The best anchorage under the cape seems to be between this ravine and the next conspicuous valley, about  $1\frac{1}{2}$  miles farther west, off which the bottom is mud.

**Cockatrice Shoal**, with 5 fathoms of water, is situated  $3\frac{1}{2}$  miles  $194^{\circ}$  from Cape Emineh Lighthouse.

**Coast.**—The coast from Cape Emineh takes a  $14^{\circ}$  direction for  $27\frac{1}{2}$  miles to Cape Galata, and the following points and anchorages are between them: Kotsan Point,  $3\frac{1}{2}$  miles to the northward of Cape Emineh; and Cape Aspro or Ak Burnu (White Point), 6 miles to the northward of Kotsan, off which breakers were seen, extending  $\frac{3}{4}$  mile eastward of the cape. There is anchorage abreast of the village of Joski (Keoschek), which lies about 3 miles southward of Cape Aspro. It affords some shelter with northwesterly winds.

**Kotsan Point** is steep and wooded on its southern side. Between this point and Cape Emineh is a sandy valley through which a river flows.

Four miles northward of Kotsan Point is a sharp point which has a clump of large trees near its extremity.

**Aspro.**—The village of Aspro, about 1 mile southward of Cape Aspro, has a roadstead abreast it which is open from north, round by the eastward to south. Small vessels anchor here, in 4 to 5 fathoms, to load wood. A wooded hill above the village is conspicuous from seaward. Between this valley and Cape Aspro the shore is white in appearance, but the cape itself is dark in color, and its slopes are covered with wood and brushwood.

From Cape Aspro the coast inclines a little to the westward of north for 8 miles, up to the mouth of the Kamchy River, and from thence for 2 miles, a little eastward of north, to Ilanjik Point.

**Kamchy River** (lat.  $43^{\circ} 0' N.$ , long.  $27^{\circ} 55' E.$ ).—The Kamchy River issues about 10 miles southward of Cape Galata. A broad and wooded plain breaks here through the hills and white cliffs, and the river winds round the northern edge of this plain or valley. It runs throughout the summer, and inside the bar was found to carry a depth of 16 feet for more than 1 mile above the entrance.

The river has a bar of 2 to 3 feet depth, but launches can anchor at a convenient distance outside and water from the river with long hoses. A low hill terminates within a short distance of the northern bank of the river, with much brushwood upon the top and rear of the ridge.

**Firewood.**—A thick forest grows on the banks of the river and supplies Constantinople with large quantities of firewood. Large stacks of billets are generally lying on the beach for sale, both at this river's mouth and on other parts of the coast.

**Anchorage.**—There is good anchorage off the Kamchy River during the summer in 10 fathoms water on a bottom of mud,  $1\frac{1}{4}$  miles from the shore; and no large vessel should approach nearer to its mouth than 1 mile as a bank of rock and gravel exists that distance  $\frac{1}{2}$  mile from it, on which there are depths of  $2\frac{1}{2}$  and 3 fathoms with 7 fathoms within it.

From Ilanjik, 2 miles north of Kamchy River, Cape Galata bears  $22^\circ$  about 8 miles, and the depths between them are 5 to 10 fathoms about  $\frac{1}{2}$  to  $1\frac{1}{2}$  miles from the shore.

**Cape Galata**, the southern point of Varna Bay, is steep and high, and is covered with cultivated fields, which give it a bright color in comparison with the somber verdure of the trees which cover the coast to the southward.

**Galata Burnu Light**, group flashing white, 213 feet above high water, visible 21 miles, is exhibited from a white stone tower located at Varna Bay.

**Varna Bay.**—From Cape Galata the coast bends abruptly to the westward, forming Varna Bay, the entrance to which lies between Cape Galata and Cape St. George, or Georgof, bearing from each other northeast and southwest, 4 miles distant. The bay is spacious, with good holding ground, composed of mud and sand, and well sheltered from southerly, westerly, and northerly winds, but open to easterly winds, which, it is said, seldom blow home. It carries a depth of 10 to 5 fathoms, the latter depth being found from 400 to 1,000 yards from the shore all round the bay.

**Anchorage.**—The best anchorage in the bay is eastward of Varna breakwater, in 7 fathoms of water.

**Foul ground.**—An area of foul ground lies in the southern part of Varna Bay,  $\frac{3}{4}$  mile northwestward from Galata Lighthouse. It appears to be about 50 feet in length, with two pinnacle heads of  $3\frac{1}{2}$  and  $4\frac{1}{4}$  fathoms, upon neither of which will the lead remain, with 5 or 6 fathoms around only a few feet distant; and the ground is foul for anchoring nearly 400 yards each side of it, there being other columnar points of rock rising to within  $4\frac{1}{4}$  fathoms of the surface, with possibly less water on them, as the pinnacles are so small that the lead

will not remain upon their summits. The bottom in the vicinity appears to be rock, thinly covered with sand.

**Varna** has a population of 37,155.

The town occupies a picturesque situation at the head of the bay on a plateau sloping gently toward the sea. High minarets show here and there above small white houses, surrounded by verdure. The most conspicuous building is the Bulgarian Cathedral, which has six cupolas.

**Communication.**—The steamships of the principal lines trading to the Black Sea call at Varna regularly. There is communication by rail with Rustchuk, and with Sofia via Tirnova; also by telegraph with the continental system.

**Coal and supplies.**—About 1,000 tons of Welsh coal was in normal times usually in stock. Fresh provisions were abundant and cheap; good water can be obtained, brought off in a water boat.

**Hospital.**—There is a large hospital.

**Harbor.**—The harbor is formed by two breakwaters. The eastern one, starting from the southeast corner of the town, runs in a southerly direction for 1,350 yards, having a short arm 110 yards long on its western side, 500 yards from its end and abreast the western breakwater. The western breakwater, starting from the western shore, runs in an easterly direction for 740 yards, leaving an opening 220 yards wide between the two breakwaters. The harbor has been dredged to a depth of 4 fathoms. A railway pier has been built on the western side of the harbor and extensive quays constructed on the northern shore.

Lake Devno, about  $5\frac{1}{2}$  miles in length in an east and west direction, with a width varying from  $\frac{1}{2}$  mile to 1 mile, and with general depths of from 7 to 10 fathoms, is situated westward of the harbor, from which it is separated by a marshy neck of land about 1 mile in width.

A canal to connect Lake Devno with the harbor is in course of construction.

**Varna Bay Light**, fixed red, 36 feet above high water, is located on the head of the west breakwater.

**Lights.**—An occulting white light, 56 feet above high water, is located on the east breakwater 1,250 yards  $174^{\circ}$  from Evlar Burnu Tabia.

A fixed red light, 36 feet above high water, is located on the head of the arm of the east breakwater, east side of the entrance.

**Coast.**—From the town of Varna the coast trends  $81^{\circ}$  toward Cape St. Demetri and Cape St. George, and is covered with country houses and gardens. The water shoals gradually to within 700 yards from the shore, with the exception of some foul ground which lies about  $\frac{1}{2}$  mile eastward of the town, 600 yards from the shore.

**Euxinograd Bay** lies westward of Cape St. Demetri. A small breakwater shelters the landing place for the royal summer palace, which is situated near Cape St. Demetri. This palace with its tower forms a conspicuous landmark.

When the Prince is in residence, the palace and the park which surrounds it are lighted by electric lights, the glare of which is visible 10 miles.

**Cape St. George.**—The northeast point of Varna Bay, named Cape St. George after a monastery behind it, should not be approached nearer than 500 yards, as some foul patches lie fully 300 yards from the cliffy points.

**St. George or Chingani Reef** lies  $2\frac{1}{2}$  miles northeast from the cape and consists of several rocky patches, extending nearly  $\frac{1}{2}$  mile along the coast and the same distance off it, over which there are only 3 and 4 feet water. There is shallow water for  $\frac{1}{2}$  mile outside the rocks, so that no vessel should approach the coast nearer than  $1\frac{1}{2}$  miles, or shoal her water less than 10 fathoms either abreast or to the northward of the reef. The marks for clearing the reef are the western end and summit of Mount Galata (the highest flat hill south of Varna Bay), a little open east of Cape St. George, bearing  $233^\circ$ .

**A bank**, about 3 miles long and the same distance offshore, with a depth of 10 fathoms over it, is shown on the chart to the northeastward of Cape St. George.

**Kavarna Bay.**—The vast curve that the coast takes to the northward and eastward between Cape St. George and Cape Kaliakra (Jelegra), which bears  $81^\circ$ , distant 22 miles, is named Kavarna Bay, in which are the smaller bays of Batova Baljik and the roadstead of Kavarna.

**Reef.**—A reef, having a depth in places of from 1 to 2 fathoms, borders the shore from St. George Reef to Baljik, and extends within the 5-fathom line, from  $\frac{1}{2}$  mile to 1 mile from the coast.

**Batova Bay** lies 9 miles northeastward of Cape St. George, and abreast a thickly wooded and very swampy plain, across which west-northwesterly winds blow with great strength. The anchorage is in 7 or 8 fathoms about  $1\frac{1}{2}$  miles from the shore.

**Baljik Bay—Anchorage.**—Baljik Bay, abreast of the village of that name, about  $3\frac{1}{2}$  miles northeast of Batova Bay and in the northwest bight of the great bay of Kavarna, serves as a place of refuge for vessels, not only in northerly winds during the winter months but from all bad weather. It is open to southeasterly and southerly winds, which the natives say never blow home, and therefore allow their vessels to winter there with great confidence. The anchorage is to the southward of the village, about  $\frac{3}{4}$  mile from the shore, in 5 to 6 fathoms, muddy bottom. There is good anchorage for a fleet in

Baljik Bay, sheltered from the prevailing winds, over a bottom of tough clay, gradually shoaling to the coast. There is a telegraph station in the village.

**Supplies.**—Any quantity of water may be obtained from a stream situated at the bottom of a ravine  $\frac{1}{2}$  mile westward of the village of Baljik. Sheep, fowls, eggs, fruit, and vegetables could in normal times be procured.

**Kavarna.**—About 9 miles eastward of Baljik and about 6 miles northwestward of Cape Kaliakra is a deep ravine divided in the middle by a triangular isolated hillock, which is easy to distinguish from all directions. Near the sea are several storehouses for grain; and at the head of the ravine, on the heights, an hour's walk from the landing place, is the village of Kavarna, which is not visible from the sea. This roadstead also serves for shelter to vessels in bad weather, but they are not equally safe as in that of Baljik, for the bottom is not so inclined at this receding portion of the coast. The anchorage is the same distance from the shore and in the same depth of water as at Baljik.

**Cape Kaliakra, or Jelegra,** which rises 80 feet above the sea, is the southern extremity of a small peninsula about 800 yards long and 200 wide. Its shores are sloping and of a reddish color, and from a little distance to the eastward it appears quite isolated from the mainland, which is higher. The cape is bordered by a reef, to which a berth of a cable must be given in passing. Shelter in northwest winds may be found under the cape.

Cape Kaliakra is remarkable for its prominence as well as for its being a point of demarcation between the high and low land. The western coast of the Black Sea for 100 miles to the southward of this cape affords (at the foot of mountains generally very picturesque) a great number of bays, coves, and harbors, more or less secure; but to the northward the aspect of the coast changes to a moderate height and level surface, with shores only slightly indented, affording but little shelter all the way to Odessa. Near Kaliakra also the bottom of the basin of the Black Sea rises suddenly to the depth of about 50 fathoms, which depths continue toward Eupatoria and Sevastopol.

**Cape Kaliakra Light,** flashing white, 196 feet above high water, visible 20 miles, is exhibited from a white tower located 190 yards from the extremity of the cape.

**Anchorage** can be obtained in 7 fathoms about 2 miles westward of the cape.

**Cape Shableh.**—From Cape Kaliakra the coast, which is flat-topped, steep, and rocky, trends northeast for  $12\frac{1}{2}$  miles to Cape Shableh (beacon), on which may be seen a tower, built in the form of a pyramid, and a little farther on a hillock.

Abreast the cape a reef extends 300 yards from the shore, on which the sea breaks when there is any swell; and off the hillock a reef extends 600 yards.

Nearly midway between Capes Kaliakra and Shableh is a large village surrounded by large trees which are conspicuous.

**Cape Shableh Light**, fixed white, 98 feet above high water, visible 15 miles, is exhibited from a white octagonal stone tower located on the cape.

**Caution.**—Local magnetic attraction has been observed between Capes Kaliakra and Shableh.

**Coast.**—From Cape Shableh the coast trends almost due north as far as Cape Midia, and is very monotonous in appearance.

The boundary line between Bulgaria and Rumania is near Ilanlik, 12½ miles north of Cape Shableh.

**Mangalia.**—This small town, 16 miles to the northward of Cape Shableh, may be recognized by its little hills and by two high minarets, of which the northern is the higher; also by a pier, constructed of piles, which shows conspicuously against the sandy beach. There is but little trade. Sheep, fowls, and vegetables could in normal times be obtained.

**Anchorage.**—Vessels generally anchor eastward of the town, about 1 mile from the shore, in 8 fathoms; but smaller vessels may anchor southward of the town, in 4½ fathoms, 1,000 yards from the shore, nearly abreast of a little valley, through which a small river flows, forming a lagoon on the beach. The roadstead is open to the eastward.

Two red buoys and a black buoy mark the approach to the latter anchorage, but they are unreliable. The red buoys should be left on the starboard hand in approaching from the eastward and the black on the port. The best anchorage is in from 4 to 5 fathoms, 400 to 600 yards to the southward of the inner red buoy. Should the buoys not be in position, a good mark for the anchorage is a minaret to the south of the town, bearing 295°, and Cape Tuzla, just open of the headland north of the town, bearing 22°.

**Rocks.**—A narrow ridge of rocks, supposed to be the remains of an old mole, is situated 300 to 500 yards from the shore to the south-eastward of the town. Another ridge of rocks, with less than 6 feet water over them, lies ½ mile offshore southward of the inner anchorage.

**Landing.**—There are numerous rocks along the shore near the town, and landing is difficult during easterly winds. Boats can land to the right of the mosque near a path which leads to the town. The best landing place is northward of the height on which the town is built. The pier is in a bad state of repair.

**Mangalia Light**, fixed white, 50 feet above high water, visible 12 miles, is exhibited from a red and white iron framework tower located on the quay.

Two fixed red lights, 28 feet above high water, visible 4 miles, is exhibited from a small white tower located on head of the north dike 500 yards 137° from Mangalia Light.

**Cape Tuzla**, 11 miles to the northward of Mangalia, is of moderate height and sloping. A few rocks run out a short distance from the cape.

**Cape Tuzla Light**, group flashing white, 206 feet above high water, visible 20 miles, is exhibited from a white iron framework with a central column on keeper's dwelling, located about 550 yards north of the cape.

This light has a red sector visible 6 miles.

**Fogsignal**.—The fogsignal is a siren.

**Coast**.—Sand hills extend for about 3 miles to the northward of Cape Tuzla, but at 3½ miles a large depression appears, in which is Lake Tuzla, separated from the sea by a low sandy isthmus. This depression and the lighthouse form the best landmarks in this neighborhood. Between Cape Tuzla and Constantza shoal water extends in places for over 1 mile from the shore, and it should be given a berth of at least 2 miles.

**Shoal**.—About 2 miles to the southward of the town of Constantza a rocky spit extends from the coast, on which there is a depth of only 9 feet, 600 yards from the shore.

**Port Constantza (Kustenjeh)**, 11 miles north of Cape Tuzla, is located on the southern side of Cape Constantza, which protects it from the north.

The harbor is formed by two breakwaters—the southern and the eastern. The southern breakwater begins at the shore near Trajans Wall and extends southeastward 950 yards, then eastward 660 yards. The eastern breakwater extends southwestward about 1,400 yards from the southern extremity of the town. About 460 yards from the outer end an arm, 130 yards long, projects toward the southern breakwater, leaving an entrance 175 yards wide.

**Constantza Light**, flashing green, 36 feet above high water, visible 8 miles, is exhibited from an iron tower located on the west arm of the new east breakwater.

**Approach**.—Approaching from eastward, a tumulus, located about 1 mile northwestward of the cape and having a fort on the summit, is a good landmark and is generally the first object seen.

The cathedral and a large hotel are the most conspicuous buildings in the town.

**Entrance.**—The entrance, about 175 yards in width and protected from the northeast and east by the eastern breakwater, has a depth of 28 feet. It is marked by lights and a lightbuoy.

**Buoy.**—A whistlebuoy, exhibiting a flashing white light, is moored 140 yards south of the southern end of the east breakwater.

**Lights.**—A group flashing white light, visible 20 miles, is located on the south end of the east breakwater.

A flashing red light is exhibited from a white iron tower located on the east head of the southern breakwater.

**Fogsignal.**—A fog siren is located at the eastern end of the southern breakwater.

**Anchorage and wharves.**—The harbor, being artificially formed, does not afford an anchorage outside of the breakwater and vessels go inside of the harbor to discharge their cargoes at the wharves, there being sufficient berths for 29 vessels. The depths alongside of the wharves is 28 feet.

A special basin for the use of vessels loading petroleum is located to the left of the entrance inside of the southern breakwater.

A fixed red light, 25 feet above high water, is located on the southwest angle of the extension of the old east jetty.

**Caution.**—With all the protection of the breakwaters, there is sometimes so great a scend of the sea alongside of the wharves that it is advisable for vessels to secure coir hawsers in preference to wire.

**Pilots.**—Pilotage is compulsory.

**Constantza (Kustenjeh).**—This town is on Cape Constantza, a low promontory projecting half a mile southeastward. It has a population of 25,000, which is rapidly increasing, but has no regular system of water supply, the water being brought in water carts 2 or 3 miles. A large number of the houses are built of stone and several stories in height, the most conspicuous buildings being the cathedral and a large hotel.

Constantza is one of the nearest points on the Black Sea to Cherna-voda, on the Danube, from which it is but 29 miles.

**Communication.**—A railway to Cherna-voda, on the Danube, has been constructed instead, and is the principal means of conveyance for the grain which is grown in the adjoining districts to the steamers for transport to the European markets. Steamers call frequently. Telegraphic communication with all parts. There is a cable to Kilios at the entrance to the Bosphorus.

**Radio.**—A wireless telegraph station has been established on the western side of the harbor, near Trajan's Wall.

**Supplies.**—In normal times all kinds of provisions can be obtained. Beef, mutton, poultry, and game were plentiful and cheap. Water could be obtained by water tanks, but it was not good.



**Coal.**—Coal in normal times could only be obtained in small quantities and was dearer than at Sulina.

**Pratique.**—The visé of the Rumanian legation at Constantinople is necessary upon the bill of health of all vessels arriving from there.

**Cape Constantza** is the eastern projection of the promontory and is bordered by some rocky uneven ground, extending upward of  $\frac{1}{2}$  mile in an east-northeastward direction from the cape, where there is a rocky patch carrying a depth of  $3\frac{3}{4}$  fathoms. Care must be taken in approaching the land to the northward of the cape for between it and Singhol Point, which lies  $2\frac{1}{4}$  miles to the northward, there are several rocky patches, more or less dangerous, lying nearly  $1\frac{1}{2}$  miles from the coast.

**Cape Midia** (lat.  $44^{\circ} 21' N.$ , long.  $28^{\circ} 43\frac{1}{2}' E.$ ) bears  $17^{\circ}$  about  $8\frac{1}{2}$  miles from Singhol Point and affords but slight shelter from northerly winds. The villages of Kara Harman, with a wood and a mill, stand on high ground  $6\frac{1}{2}$  miles northward of the cape, and this high land is visible for a long distance. Northward of these villages the coast becomes low and sandy, which indicates the approach to the mouths of the Danube.

**River Danube.**—At its source the Danube is about 3,000 feet above the level of the sea and its course lies through an Alpine country to Ulm, where its elevation is 1,500 feet above the sea. At Ulm the Iller joins the Danube and it becomes navigable for flat-bottomed boats of 100 tons. The river here is 300 feet broad.

At Donauworth, 40 miles below Ulm, the Danube is 180 yards wide and steam navigation begins as steamers ply daily from May to September between Donauworth and Ratisbon. Between Neustadt and Ratisbon the river forces its way through a defile (named Lang Wand), nearly 1 mile in length, the sides of which consist of perpendicular cliffs 400 to 600 feet high. The summits of these cliffs are in places not more than 150 feet apart and overhang the water. At the eastern end of the defile is Kelheim, at the junction of the Altmuhl with the Danube, and the Altmuhl is joined to the River Main, at Bamberg, by the Ludwig Canal, 110 miles long and 7 feet deep, so that it is possible to traverse the European continent by water from the North Sea to the Black Sea. Ludwig Canal has 100 locks, each with a depth of from 3 to 6 feet. Kelheim is much exposed to ice bursts and inundations.

From Ratisbon (Regensburg), the most northern point of the Danube where there is a harbor, to Passau, on the borders of Bavaria, the difficulty of navigation is so great that steamers have ceased to run between these places, but works are shortly to be undertaken to render this part navigable.

At Passau, a frontier town of Bavaria, the Ina River joins the Danube, which is here 800 feet above the sea, 220 yards in width,

and 23 feet deep. At Passau the steam navigation of the Danube again proceeds, and Austrian steamers ply regularly in summer between the town and Vienna. Below Passau the right bank of the river is Austrian and the left Bavarian as far as Engelhartzell, just above which a reef of rocks produces a rapid.

Below Engelhartzell the valley of the Danube becomes wider, but about halfway between that town and Aschach is contracted by a second defile, which causes much commotion in the stream of the river. Between Aschach and Linz is an archipelago, and the channel of the river is so constantly changing that navigation is intricate. Before reaching Linz the Danube passes through a chain of mountains which descend to the river in steep cliffs. At Linz, a town of 58,000 inhabitants, the river is crossed by a stone and iron-trellised bridge, 1,700 feet in length.

From Linz the distance by the river to Vienna is 126 miles, and steamers leave daily, descending in 8 or 9 hours, but occupying 18 to 20 hours in the ascent. A few miles below Linz is Enns. From here the fall of the river to the frontier of Hungary amounts to 348 feet, or an average of  $2\frac{1}{2}$  feet per mile. Below Grein the Danube passes through a granitic chain of hills and forms a rapid named Greiner Schwall. At Mantern, about two-thirds of the way from Linz to Vienna, a wooden bridge crosses the river and is the only bridge between Linz and Vienna.

The minimum depth between Passau and Vienna is 4 feet when the river is low, excepting at the Fischameat-Thabea Rapids, where it is 3 feet.

From Vienna the Danube flows east for 150 miles through a wide expanse of flat country to Waitzen, and then turns south to Budapest, 182 miles below Vienna. Between Vienna and Pressburg the river is split up into numerous narrow channels, but from Pressburg to Budapest, viz, at Grein, it is again shut in by high land, and, being here a wide expanse of water, looks more like a lake than a river. Steamers occupy about 13 hours on the voyage from Vienna to Buda-Pest.

At Budapest the river is spanned by a suspension bridge, 1,200 feet in length and 37 feet in width, beneath which the Danube, 54 feet deep, attains a velocity of 7 to 8 knots. A harbor is being constructed at Budapest, consisting of three basins, with a minimum depth of 10 feet.

From Budapest to Semlin, 305 miles, the Danube runs south and southeast with numerous windings, and widens out, occupying a bed disproportioned to the volume of its waters, and the navigation is consequently constantly impeded by shallows and shifting beds of sand and gravel. Semlin is a frontier town of Hungary on the right bank of the Danube, and, being near the junction of the Danube, Save, and

Theiss, and upon the high road from Vienna to Constantinople, is a place of considerable trade. Here the Danube is nearly 3 miles wide, and there is a steam ferry boat running across the Save to Belgrade, the capital of Servia. The river steamers occupy 32 hours on the voyage from Buda-Pest to Semlin.

From Semlin to Old Moldova, 76 miles, and from thence to Old Orsova, 63 miles, the Danube flows nearly due east. At Old Moldova it enters a series of rocky gorges, unequaled in Europe for grandeur, and after sweeping through a succession of deep pools and shallow rapids, confined within the passes of Steuka, Izlaz, and Kasau, finally reaches its last and most formidable rapids, called the Iron Gates, 632 miles from Vienna and 570 miles from the Black Sea. The Iron Gates, 6 miles below Orsova, the frontier town of Hungary, are wholly within the territories of Rumania and Servia, and are nearly 1 mile in length, with inclinations of 1 in 507 at high river, and 1 in 307 at low water—the extreme variations between high and low river being here 14 feet 6 inches at the upper end and 22 feet 6 inches at the lower end of the gates. The level of low river at Old Moldova is 201 feet above sea level and at the lower part of the Iron Gates 118 feet.

The depth at low river in the rapids between Old Moldova and Orsova is in places  $1\frac{1}{2}$  feet, and when the river falls to 3 feet above its lowest level all navigation is suspended there. Steamers drawing 5 feet can only navigate the Iron Gates in safety when the river is 8 feet above its lowest level, as shown on the Orsova gauge. The average annual interruption to the navigation owing to ice obstruction and the low level of the river is said to be 150 days.

A canal commencing at Orsova on the Servian shore of the river enables vessels to avoid the rapids of the Iron Gates.

The general width of the Danube between Vienna and the Iron Gates is from 2,000 to 6,000 feet when the river is low, and from 7 miles to 30 miles when the river is high, but there are exceptions to this, viz, at Peterwardein, 50 miles above Belgrade, the width is 800 feet; and at Kasau, a pass  $5\frac{1}{2}$  miles in length, 600 feet; but in those places the depth is greatly increased, being 40 feet at Peterwardein and 80 feet at the Kasau Pass, when the river is low, and the difference between high and low river at the Kasau Pass is about 23 feet.

The mean velocity of the current from Vienna to the Iron Gates is 2 or 3 knots, but at the narrow defiles it attains a velocity of 8 knots at high floods.

The traffic between Belgrade and Budapest is carried on in barges, with a carrying power of 250 tons, and about 600,000 tons is annually transported up river. The largest steamers are from 220 to 250 feet long, 25 to  $27\frac{1}{2}$  feet broad, and 10 feet deep, with a displacement of about 450 tons.

**Lower Danube.**—The lower Danube commences at the lower end of the Iron Gates, 570 miles by river from the Black Sea. The fall of the river gradually decreases as it nears the sea, being  $103\frac{1}{2}$  feet between the Iron Gates and Chernavoda, 338 miles, or an inclination of 1 in 19,800; between Chernavoda and Braila the fall is 11 feet in 76 miles, or 1 in 36,500, whilst from Braila to Sulina the fall is but 3 feet in 92 miles, or 1 in 186,360.

The width of the Danube 8 miles below the Iron Gates (at Turnu-Severin) is 3,000 feet, and its maximum depth 18 feet. From here to Widin (83 miles) its course is tortuous and generally in a southerly direction, but from Widin to Chernavoda its course is in a general east direction for 300 miles, and at Chernavoda the width of the main river is 2,000 feet, and its depth, when low, 28 feet and  $14\frac{1}{2}$  feet above the sea level, the extreme variation between high and low river being 23 feet. When the river rises 18 feet above its low level, the whole country is inundated, and the swollen waters extend across to the village of Fetesti  $8\frac{1}{2}$  miles.

The Danube at Chernavoda, 171 miles from Sulina, is but 40 miles from Constantza on the Black Sea. There is a railway between the two places which crosses the Danube at Chernavoda by a bridge 100 feet above the water, with spans 460 feet wide, with the exception of the central one, which has a width of 630 feet.

Below Chernavoda the Danube bends to the north for a distance of 90 miles to Galatz (11 miles below Braila), thence it flows in a southeasterly direction to the sea.

The Danube discharges itself into the Black Sea at the St. George and Sulina mouths, and through the numerous outlets of the delta of the Kilia; and if the volume of water flowing out is, for the sake of comparison, supposed to be constituted of 100 parts, it is estimated that 24 of these issue from St. George, 9 from Sulina, and 67 from the Kilia branches. Tulcha, situated on the right bank proper of the Sulina branch, is distant 39 miles from the entrance, and Ismail, on the left bank of the Kilia branch is 55 miles from Sulina Mouth. From the same entrance, Isakcha, Reni, and Galatz are 56, 70, and 81 miles, respectively.

**Navigable depths.**—Between the Iron Gates and Braila the general width of the river when low is about  $\frac{1}{2}$  mile. At times when the river is very low the depth at certain spots between those places does not exceed 9 feet; and over three shoals, Nicopoli, Sistov, and Chernavoda, it is then 7, 6, and  $4\frac{1}{2}$  feet, respectively. Owing to the existence of these shoals, which often shift their position, seagoing vessels rarely ascend higher than Braila. At ordinary high river, vessels drawing 12 feet can navigate the river from the Iron Gates to Braila without difficulty. From thence to the sea a minimum depth of  $18\frac{1}{2}$  feet is maintained.

The extreme difference between high and low river is  $24\frac{1}{2}$  feet at Turnu-Severin, 23 feet at Nicopoli and Chernavoda, and  $19\frac{1}{2}$  feet at Braila.

Cuttings have been made across bends in the Sulina branch, thereby straightening the ship channel and reducing the distance in the river by 11 miles. The cuttings are 300 feet wide at the bottom, 340 feet at the water line, and have a minimum depth of about  $18\frac{1}{2}$  feet.

At the bifurcation of the river, about 4 miles to the northwestward of Tulcha, is the Chatal d'Ismail, an artificial embankment or mole, stretching out into the river in a northwest direction. This, diverting a portion of the stream from the Kilia into the Tulcha branch, increases the volume of water and scours out the Sulina Channel. The depths at the entrance and in the river depend altogether on the month of the year and the character of the season, and a standard zero has been established to which surroundings over any part of the river may be reduced, showing the actual depths which would exist over all the shoals if the river was at its lowest.

**Dates of high and low river.**—The highest water in the river may be expected from February to July and the lowest from September to December, depending altogether on the state of the weather during the year. The river and Black Sea are about zero at Sulina Mouth during winter months, but the level is sometimes raised 2 feet by winter floods.

During the low water season the level of the river for several miles from its entrance is raised by easterly, and lowered by westerly winds, but when the river is in flood this influence of the wind is not observed, excepting near Sulina, where the Black Sea affects the level.

In the year 1889, spring floods were very high and the water rose 11 feet 7 inches above low water mark at Tulcha; in 1890 there was no marked flood, the level being only 7 feet 8 inches above low water at Tulcha; and in October of the same year the water was only 4 inches above the lowest known, the available depth 44 miles from Sulina being 16 feet 3 inches; but during the whole of this period of low water the depth of  $20\frac{1}{2}$  feet was maintained at Sulina Mouth, and a similar depth was preserved during the year 1891.

The statistics of different years are given with a view to show the changes in the river under various circumstances. It will be noticed how little they actually affected the normal depth at Sulina Mouth.

**Current.**—The current setting down the river varies in velocity according to the conditions, the maximum observed being 5 knots at the mouth in abnormally heavy floods and the minimum  $\frac{1}{2}$  knot during the very low water, the ordinary rate not exceeding 3 knots. During a river flood with a northeasterly gale the water has been banked up to 4 feet 3 inches above zero; with strong westerly winds, and a low river, the water is reduced to 1 foot 6 inches below zero,

thus giving the extreme and mean ranges as 5 feet 9 inches and 2 feet, respectively, at Sulina Mouth.

**Ice.**—The normal closing time is during the first 10 days in January, but sometimes it occurs earlier and sometimes later; again it remains open all winter long.

The general duration of the ice is 37 days.

Before closing the river generally smokes for 1 or 2 days; then the frost sets in hard and the river freezes rapidly.

**European commission.**—The maintenance of the channels in the Danube delta, and the regulation of the traffic as far as Braila, a distance of 93 miles from the sea, is vested in a European commission, formed by representatives of the following nations: Austria-Hungary, France, Germany, Great Britain, Italy, Rumania, Russia, and Turkey.

This commission has power to levy dues on vessels navigating the river within its jurisdiction.

**Portici** (lat.  $44^{\circ} 41' N.$ , long.  $29^{\circ} 2' E.$ ).—The southern mouth of the Danube, named the Portici, is 24 miles northeastward of Cape Midia, and leads into Razem Lake, which communicates by a very narrow channel with the Danube at Donavitza. From Portici Mouth the shore of Dranova Island, which forms part of the delta of the river, trends for 28 miles to the eastward, up to St. George Mouth. It is very low and is marked in places by fishermen's huts.

**Anchorage**, which affords good shelter from northerly winds, may be obtained in about  $5\frac{1}{2}$  fathoms, over mud and shells,  $2\frac{1}{2}$  miles from the coast.

**Beacons and buoys.**—A tripod beacon, with horizontal battens and a black top, is situated near the Portici huts at the river entrance; and a wooden beacon, 50 feet in height, stands near the beach  $8\frac{1}{4}$  miles farther to the eastward.

Eight buoys, in line, about  $2\frac{1}{4}$  miles apart, in a depth of 5 fathoms, mark the anchorage, a red buoy being at each end, with six black buoys between. From the western buoy the wooden beacon bears  $298^{\circ}$ ,  $4\frac{1}{4}$  miles; from the eastern buoy, Sandy Island Lighthouse bears  $3^{\circ}$  3 miles. The two eastern buoys are spherical in shape and have each a spherical topmark.

**St. George Mouth.**—This mouth of the Danube,  $1\frac{1}{2}$  miles across from lower Olinka Island to St. George Point, is blocked up by extensive sand banks with 3 feet water over them, and has three islands in the entrance. The principal channel is northward of this bank and close past St. George Point and has depths of from 8 to 12 feet. The depth increases to 24 and 30 feet when inside, off the village of St. George or Kedrilles, above which the channel has depths of from 11 to 75 feet. Another channel, beginning with a flat of 3 to 4 feet depth, lies between the Olinka Islands and the western shore.

The St. George branch joins the Sulina branch at the Chatal de St. George, near the thirty-fourth milepost from Sulina. A black post, carrying a white lantern, from which is exhibited a fixed green light, marks the junction of the two branches.

Since the improvements at the Sulina Mouth, this entrance to the Danube is not used as much as formerly, except by fishing boats. The principal industry carried on at this mouth is the sturgeon fishery and the export of caviare and isinglass. There is a telegraph station in St. George village.

**Danube River Light**, flashing whit, 65 feet above high water, visible 14 miles, is exhibited from a black wooden tower located on Sandy Island, south of Olinka Island, at the St. George Mouth of the River.

**Fogsignal**.—An explosive fogsignal is used.

**Beacons and buoys**.—The shoal ground, extending to the eastward and southeastward from St. George Mouth and Sandy Island, is marked by beacons and buoys.

The northern beacon, consisting of a mast surmounted by two cages, is placed in about 8 feet water, with Sandy Island Lighthouse bearing  $234^{\circ}$ ,  $2\frac{4}{10}$  miles. Approximate position, lat.  $44^{\circ} 52' 40''$  N., long.  $29^{\circ} 30' 30''$  E.

The southern beacon, consisting of a mast surmounted by a barrel, is placed in about 4 feet water, 2 miles to the southward of the northern beacon, with Sandy Island Lighthouse bearing  $343^{\circ}$ , distant 2 miles.

The southern edge of this shoal ground is marked in 5 fathoms by the two spherical buoys with spherical topmark mentioned above.

**Caution**.—Shoal water is reported to extend about 1 mile outside the beacons, or much farther eastward from the bar of St. George Mouth than is shown on the charts.

**The Sulina**, or middle entrance to the Danube, which has been artificially regulated to pass between two piers stretching out from the coast at the mouth of the river, is 17 miles to the northward of the St. George, and is the only branch made use of for commerce on account of the greater depth maintained at its mouth. Its waterway, which has been shortened and straightened by various cuttings, extends 43 miles from the seat to Chatal d'Ismail Point, and is from 300 to 600 yards wide. Its banks in some places are 7 feet high and never less than 4 feet, and it carries a minimum depth of  $18\frac{1}{2}$  to 19 feet.

**Depth on bar**.—The channel over the Sulina Bar has been dredged to 24 feet lowest level. The depths are liable to change and will generally be least outside the pierheads about June, July, and August. The depths between the piers will be least in the winter months before the descent of the river floods, which generally commence in March.

**Depth signals.**—The depth of water (in feet) on the bar is shown in figures from the old lighthouse, so as to be visible from the bar by the aid of a telescope.

**Lights.**—An alternating and occulting white and red light, 38 feet above high water, is exhibited from a white cylindrical tower with a green dome located on the south mole at Sulina Mouth.

A fixed green light, 10 feet above high water, is exhibited from a pile beacon located on the south side of the channel.

A fixed white light, 70 feet above high water, visible 14 miles, is exhibited from a cylindrical white tower with a green dome located in the eastern part of the city.

A fixed red light, 45 feet above high water, visible 8 miles, is exhibited from a white circular tower with a red dome located on the head of the north mole off Sulina Mouth.

**Fogsignals.**—An explosive fogsignal and a fog bell are located at the Sulina Mouth. (See Light List.)

**Buoys.**—An automatic whistlebuoy is moored off Sulina entrance, with the lighthouse at the outer extremity of the South Pier bearing  $247^{\circ}$  1.4 miles. A bellbuoy is moored in 25 feet, about 700 yards from the pierheads. Vessels should pass to the northward of it. A black buoy, in 25 feet, marks the eastern extreme of Sulina Spit, and another black buoy is moored nearly midway between the whistlebuoy and the bellbuoy.

The old lighthouse in line with the North Pier Lighthouse, bearing  $246^{\circ}$ , leads over the bar northward of the bellbuoy, in about 24 feet.

**Directions.**—The master of a vessel who has never been at Sulina should take his departure from Fido Nisi or Serpent Island, which bears about  $75^{\circ}$ , 23 miles from the North Pier Lighthouse, and steer  $258^{\circ}$ , when, if the weather is clear, he will make right ahead, Besh Tepe, a remarkable mountain, rising from 700 to 800 feet above the sea. The Sulina water tower, lighthouses, and the buildings on both banks of the river will rise successively to view, and when near the whistlebuoy a vessel should stop or anchor and await the arrival of the pilot.

The water becomes very muddy as the river is approached, a fact worthy of notice in thick and foggy weather.

The set of the current in the offing is  $157^{\circ}$  with a velocity of  $\frac{1}{4}$  to  $\frac{1}{2}$  a knot. The surface water to the depth of about 3 feet is influenced by the wind. The inshore current is very variable both as regards strength and direction.

When approaching Sulina from the southward, great attention should be paid to the soundings, and a vessel should not approach the shore within the 10-fathom curve.

**Caution.**—As the effect of a river flood is the extension and shoaling of the Sulina Spit, or south bank off the Sulina Mouth, and the



buoys are liable to be swept away by storms, vessels are cautioned to keep well to the northward on entering or leaving the river, more especially as the current sets south during the prevailing northerly winds.

Fog and snow banks are peculiar to the vicinity of Sulina.

**Town** (lat.  $45^{\circ} 9\frac{1}{2}'$  N., long.  $29^{\circ} 40'$  E.).—The town of Sulina, which includes the principal buildings of the European commission, the Marine Hospital, pilot and lifeboat stations, is situated on the south bank of the river, partly surrounded by swamps, the workshops and the houses of the employees of the European commission being on the north bank of the river. The population numbers about 5,000.

A short distance west of the town there is a water tower 134 feet high, which may be seen from a distance of about 17 miles in clear weather.

**Loading.**—Sulina is the chief shipping place for the grain of the entire Danube region, the cargo being brought down the river in large lighters, carrying from 1,500 to 3,000 tons. Vessels are loaded from floating steam elevators. It will always be advantageous to load at Sulina rather than at Galatz or Braila, the passage of the river being attended with risks even under the most favorable circumstances. The Danube is normally heavily charged with sediment, and in time of flood this condition becomes aggravated, and in consequence of this the season at which the greatest depth of water may be expected is the time when shoals form with the greatest frequency and rapidity. It may happen that a vessel with the regulation draft of water may suddenly find it necessary, under pain of heavy penalties, to stop and lighten cargo. It must be borne in mind that these occurrences result not from the falling of the water, but (so to speak) from the rising of the bed of the river.

**Communication.**—Steamers call regularly. There is telegraphic communication with Galatz.

**Coal and supplies.**—In normal times about 5,000 tons of Welsh coal is kept in stock. There is a coal wharf 1,500 feet in length on the south side of the river at the western end of the town, alongside which two steamers can coal at the same time. About 1,200 tons can be loaded in 24 hours.

Meat, vegetables, and bread could be procured, but are not plentiful. Good drinking water can be obtained at the south jetty.

**Lifeboats.**—There are two lifeboats at Sulina.

**Hospital.**—Seamen are treated gratuitously at the Marine Hospital.

**Seamen's Institute.**—There is a British Seamen's Institute in Sulina.

**Port regulations.**—The roadstead of Sulina, extending 2 miles seaward, and the port 3 miles up the river from the entrance, are under the authority of the captain of the port. From thence an in-

spector of navigation has charge of the navigation of the river as far as Braila. Officers in charge of vessels are required to communicate with the captain of the port within 24 hours of their arrival and to obey all orders received from him, the inspector of navigation, or his subordinates, obedience to such orders being, if necessary, enforced by the naval vessels on the station.

All vessels entering the Sulina Mouth must have at least 1 foot less draft of water than the depth indicated as existing on the bar at the time. Steamers of more than 800 tons register are to be provided with an auxiliary rudder unless the captain of the port is satisfied that they are capable of navigating the river without it.

Steamers which come down the river and exceed 130 feet in length are not allowed to turn in any part of Sulina Port occupied by other vessels; and steamers, more than two abreast, may not move in the port when lashed together.

No boats are permitted to move about in the port, or from the port to the roadstead at night unless carrying a lighted lantern.

**Pilotage.**—Pilotage is compulsory except in the case of vessels of less than 100 tons register or 150 tons when crossing the Sulina Bar in ballast, and sailing vessels ascending the river when the master remains on board. Pilots meet vessels near the whistlebuoy,  $1\frac{1}{2}$  miles seaward of the entrance, in a steam pilot vessel, and are bound to board, when weather permits, or to signal how they may enter. The pilot vessels fly the flag of the Danube commissioners, and by night carry a red light at the foremast head 8 feet below the prescribed white light.

Colors showing the vessel's nationality must be hoisted before entering; and should explosives form any portion of the cargo, a declaration to that effect must be made to the pilot, and a red flag hoisted at the fore, special anchorage being provided under these circumstances.

Although the employment of pilots is compulsory, should the state of the weather prevent the pilot boarding, a blue flag will be hoisted at the lighthouse on the south pier. The captain may then enter the port without a pilot, but on his own responsibility.

Officers in command of vessels incur a serious responsibility by proceeding at a higher rate of speed than that indicated by the pilot or by inducing him to adopt a higher rate of speed than his experience would warrant.

The pilots place at the disposal of the captain their experience and knowledge of the river; but as they can not know the defects and difficulties in maneuvering, stopping, going ahead, etc., of each ship, depending as they do upon its engines and construction, the responsibility for the vessel's movements lies entirely with the captain. The European commission admits no responsibility for damages incurred by the ship itself nor for other damages of any kind.

The river pilots who take charge above the port form an entirely distinct service from the sea pilots. Naval vessels and vessels of under 200 tons pay no dues or pilotage. Pilots are strictly forbidden to accept any gratuity.

There are pilot offices at Sulina, Galatz, and Braila.

**Mooring at Sulina.**—The port is divided into four sections, which are numbered from seaward. The limits of the sections are marked by posts of various colors on both banks of the river. The first section is reserved for naval vessels and vessels belonging to the European commission of the Danube. It is also used by steam vessels plying regularly to the Danube. The second section is for tugs, for laden vessels awaiting favorable weather to go to sea, and for sailing lighters. The third section is for vessels bound upriver and for empty barges and lighters. The fourth section is for vessels taking in cargo and is divided into 50 berths, 25 on each side of the river.

Of the two berths allotted to naval vessels the one on the south side of the river is very inadvisable to have in the winter months as during the frequent northerly gales there is great difficulty in keeping the vessel off the pier.

The lower part of the port, on the left bank, below all other vessels, is reserved for vessels carrying petroleum.

Vessels carrying explosives must fly a red flag and anchor in the upper part of the port above all other vessels.

Ships must be anchored in the berths pointed out by the port officials, who will give all necessary directions regarding the placing of hawsers.

Anchors must always be ready for letting go, and a kedge for laying out in case of necessity.

A bow and quarter pole must be taken on board. They can be obtained from the works of the European commission on the north bank of the river. The spike of the quarter pole is put in the bank or lashed to a bollard on the quay, and the other end of the pole against the vessel's quarter to keep her stern off the bank, whilst the bow is kept off by a bower anchor, the ship being breasted in with springs.

**Quarantine.**—The detached mole on the north side of the entrance to the port is reserved for vessels in quarantine. The health officer boards vessels opposite the British consulate.

**Ballast.**—Ballast is landed at different places in the port of Sulina and on the river bank, which are selected from time to time by the inspector and captain of the port. It is strictly prohibited to throw it overboard anywhere inside the 10-fathom curve, either in the port or roadstead.

**Regulations for navigation of the river.**—Steam vessels of more than 800 tons register must be provided with an auxiliary rudder before proceeding up the Sulina branch.

**Buoys and leading marks.**—In difficult parts of the river the channel is marked by can buoys.

Red buoys indicate that the channel lies between them and the right bank, and they must therefore be left on the starboard hand by vessels proceeding upriver; and black buoys, that the channel lies between them and the left bank. The channels are also marked by leading beacons, consisting of posts with diamond-shaped topmark, painted black with a white vertical line, erected on the banks of the river.

Mileposts on the left bank indicate the distance from Sulina in nautical miles.

**Lights.**—The first  $8\frac{1}{2}$  miles of the Sulina branch is lighted by red lights on the northern bank and white lights on the southern bank. There are nine lights altogether—five white and four red.

A black post, surmounted by a white lantern, about 20 feet in height, from which a fixed green light is exhibited, marks the junction of the Sulina and St. George branches.

An iron framework lighthouse, about 20 feet in height, painted white, from which a fixed green light is exhibited, is situated on the extremity of a line of rocks jutting out from the south shore of the river about  $\frac{1}{2}$  mile below Tulcha.

A white post surmounted by a white lantern, about 20 feet in height, from which a fixed red light is exhibited, is situated at Chatal d'Ismail, and marks the junction of the Tulcha and Kilia branches.

**The rules of the road**, and regulations regarding lights, are the same as those in general use at present with the following additions: Vessels proceeding in the same direction should not as a rule endeavor to pass one another; and those passing in opposite directions should only do so in places where the breadth is sufficient. Ships going up the river should wait below all narrow places and bends to allow descending ships to pass; and the use of the steam whistle indicating direction of helm or reversal of engines is advisable, and the whistle signal of the descending vessel is the ruling one.

When one steamer wishes to pass another going in the same direction either of the following signals may be used:

- (a) Five strokes on the bell.
- (b) Five whistles.
- (c) Waving a flag on the forecastle.
- (d) Hoisting a blue flag half-mast by day.
- (e) Hoisting a white light half-mast by night.

A steamer wishing to pass a sailing vessel should make one of the signals prescribed above and pass to leeward of her. Speed should be slackened when passing grain-laden lighters or dredgers, and in all cases where the wash is likely to be injurious, also when approaching bends, until it is assured that the river is clear ahead; and steamers

should never attempt to pass unnecessarily close to any vessel, especially one dropping down with the stream.

A sailing ship overtaking another should hail the overtaking vessel and pass to windward of her.

Sailing vessels tacking must avoid getting in the way of steamers. Sailing vessels with the wind free must keep out of the way of vessels close-hauled, or vessels drifting. Tugboats and light steamers proceeding up the river navigate at night.

Vessels anchored or moored in the river for the night are required to have a lantern placed on the yardarm, or other conspicuous part, on the side toward the channel, which can be seen both up and down the river. If more than 150 feet long, they must in addition show a white light at or near the stern of the vessel. Rafts navigating at night should show a white light at each angle and three white lights placed vertically at the masthead. When secured to the bank, the lights will only be exhibited from the angles toward the channel. No boats are permitted to move about the port of Sulina or from the port to the roadstead at night unless carrying a lighted lantern.

The ordinary fogsignals must be used in thick weather by vessels under way, also sound signals by steam whistle to indicate the course to other vessels under way; but ships anchored in the port of Sulina, or moored at the quays alongside the banks, are forbidden to use either steam whistles or foghorns under any circumstances, and the use of the steam siren is strictly prohibited between the bellbuoy and the third milepost.

**Speed limits.**—Vessels of more than 800 tons register must not exceed a speed of 8 knots per hour when navigating the Sulina branch of the Danube. When, however, the river is high, permission may be obtained from the inspector of navigation for vessels bound down the river to proceed at 9 knots.

Vessels under 800 tons, which the commissioners consider might, if they exceeded 8 knots, cause damage to the river banks, may also receive instructions to proceed at this modified speed.

When the river is low it is recommended that all vessels should reduce speed to 5 knots, especially in the upper portion of the Sulina branch and in the cuttings.

Steam vessels must reduce speed as far as possible when passing through the ports of Sulina, Tulcha, Reni, Galatz, and Braila.

**Tracking.**—There is a towing path on the south bank of the Sulina branch, having a least breadth of 20 feet, which is for use in tracking vessels by employing draft animals or landing a portion of the crew. The path may also be used for foot passengers and carriages. As mooring posts have been put up along this branch, driving in stakes or fixing anchors for the purposes of tracking is contrary to regulation.

To haul a vessel up this branch with her crew, a 2 or 3 inch line should be rove through a block lashed at the foretopmast head and the running part sent on shore, the standing part being made fast to the deck, bearing in mind that there is no danger of grounding where the banks are high and perpendicular.

Having advanced as far as Chatal Point, a vessel can not proceed any farther by hauling as there is no pathway on the right bank of the river and the Cossacks that patrol the left bank object to it.

**Anchoring and mooring.**—Anchors must always be ready for letting go and a kedge for laying out in case of necessity.

Posts are provided on both banks of the river to which vessels may secure; but if hawsers are laid out across the stream, they must be promptly slacked should another vessel require to pass, and on no account are they to be left across the stream during night or in foggy weather.

Anchoring or mooring alongside the banks is forbidden in the bends of the river in any portion situated between the posts having an anchor reversed painted on them, or in the navigable channel. Vessels must never be moored more than three abreast alongside either bank, and while at anchor the yards must be braced fore and aft.

In the event of grounding in the river a lookout man must be sent to some suitable place, at least  $\frac{1}{2}$  mile above the spot where the ship has taken the ground to warn all vessels coming downstream and acquaint them with the position of the ship. With as little delay as possible, the circumstance should be reported to the inspector; and if necessary to obtain tugs and lighters, tenders for refloating should be telegraphed for.

Posts, surmounted by red rectangular crosses, indicate places where large vessels descending with the current can most easily, in case of need, swing to their anchor.

**Caution.**—As a general rule, when the banks of the river appear steep there is deep water; where trees and reeds grow to the water's edge it is shallow.

**Depth signals.**—The depths on the shoals in the Sulina branch are posted in a conspicuous place on the south bank of the river at Sulina, also near the twenty-first milepost, and are shown in English feet. At Tulcha they are posted on one of the commission store-houses above the port.

When sudden changes occur in the least depths of water in the Sulina branch, the amount is indicated by black balls hoisted on the flagstuffs of the inspectorates at Chamourli, Gorgova, Chatal de St. George, and Tulcha, each ball shown representing a decrease in depth of 3 inches.

**Tugs.**—Powerful tugs can always be obtained.

**Dredging operations.**—A space of about  $\frac{1}{2}$  mile above and below dredgers lying in any part of the river is marked at the extremities by stakes surmounted by blue flags, and when in this space passing vessels should proceed at reduced speed. When the stakes are surmounted by two barrels, the space included is closed to navigation between the hours of 6 p. m. to 6 a. m.

**Lower Danube ports.**—Vessels that have loaded at one of the ports on the lower Danube and do not require to stop at Sulina may proceed direct to Sulina roadstead.

**Tulcha** (lat.  $45^{\circ} 10' N.$ , long.  $28^{\circ} 48\frac{1}{2}' E.$ ), situated on high ground on the south bank of the Danube 39 miles above Sulina, has a population of about 20,000 people of various nationalities. A prefect and the inspector of the European commission reside here, and there is a telegraph station.

**Hospitals.**—There are two hospitals—a civil and a military.

**River level.**—The zero level of the river is only 1.01 feet above the Black Sea level, but during a heavy flood the river has been known to rise 14 feet 5 inches above the Black Sea, the mean range being 9 feet.

**Caution.**—When proceeding up river and rounding Tulcha bend, an anchor should be ready for letting go, as in endeavoring to avoid the rock (marked by a light beacon) off the right bank, vessels hug the other shore where the water is slack, but at the bend when they wish to turn up, the full force of the current catches the bow, swinging it off to port. This is said to be the cause of the numerous strandings at this point.

**Anchoring and mooring.**—Vessels are not permitted to anchor in the navigable channel nor between posts bearing reversed anchors, and they must moor on the south bank of the river above the town and never more than three abreast. The buoys are not to be used for mooring, except by regular steamers, stopping for a short period. Ships may, however, use them for warping round the Tulcha Curve, but only one vessel at a time is allowed to haul on the same buoy.

**Isakcha** (lat.  $45^{\circ} 16' N.$ , long.  $28^{\circ} 28' E.$ ), on the south bank and 56 miles from Sulina, is a small town exporting tobacco. There is a telegraph station.

**Pier.**—A pontoon landing pier, at which the river steamers berth, is situated about 1 mile below the town, with which it is connected by a good road.

**Reni**, situated on the north bank, 69 miles above Sulina and 2 miles below the mouth of the Pruth, is connected by railway with Odessa, via Kishinev; also, with Galatz, it has been opened by the Russian Government as a trading port. The population numbers about 5,000.

**Directions.**—All vessels must pass Reni slowly. A blue flag hoisted at the yardarm of a flagstaff on the quay is a signal for vessels to pass Reni as slowly as possible.

**Pruth River.**—The Pruth River, which falls into the Danube about 2 miles above the Reni, has a total length of about 500 miles and is navigable for lighters for about 217 miles. During the dry season the depth of water in places is not more than 2 feet, but in the spring the river rises from 10 to 12 feet.

**Galatz,** situated on the north bank of the river and between the seventy-ninth and eighty-third mileposts above Sulina, is a well laid out and beautiful town with a population of about 75,000. The river side is bordered by a quay which is lighted by electricity. Carriages can be hired at a moderate price, and there is an efficient service of electric tramcars.

The headquarters of the European commission of the Danube are at Galatz.

**Communication.**—There is railway communication with Bucharest and with the continental system; also telegraphic communication with all parts.

Steamers run between Galatz, Reni, Tulcha, and Ismail, stopping off Isakcha if there are passengers or goods. There is also a good service of steamers which run to Braila.

Steamers from London and Liverpool call regularly; other steamers' lines call at irregular intervals.

**Mooring.**—Part of the quay is reserved for naval vessels and part for merchant vessels. It is necessary to let go the port anchor before making fast alongside. The most convenient berth for a naval vessel is halfway between the eighty-first and eighty-second mileposts, abreast the pilot office. The Rumanian Navy is moored in the stream.

**Docks.**—A wet dock or basin is situated near the lower end of the town. Its dimensions are: Length, 1,640 feet; width, 395 feet; breadth at entrance, 131 feet; depth in the basin  $16\frac{1}{2}$  feet at zero; depth at entrance,  $19\frac{1}{2}$  feet. There are two traveling cranes, one of which is capable of lifting 40 tons, also a fixed crane, which will lift 10 tons, and a grain elevator which will store 25,000 tons.

There is a floating dock, 262 feet long and 55 feet broad, at entrance. It is in two sections, which can be used either separately or combined, and has a total lifting power of 2,400 tons. The Government dock is 167 feet long and 49 feet broad at entrance, with a lifting capacity of 300 tons.

**Coal and supplies.**—About 7,000 tons of Welsh coal was in normal times usually kept in stock. Coaling can be carried out from bullock carts or lighters alongside the quay, where there is a depth of 30 feet, or in the basin. Fresh meat, vegetables, and bread



could be obtained, also water of excellent quality from hydrants on the quay.

**Braila.**—This town, on the north bank of the river, is situated between the ninety-first and ninety-third mileposts, immediately above the junction with the Machin Branch. It is the limit of navigation for seagoing vessels. The town is lighted throughout by electricity, has electric trams, and contains a population of over 60,000.

**Mooring.**—A granite quay has recently been constructed, alongside which are six loading berths with two pontoons attached to each, connected with the quay by portable iron spans. It is proposed to extend the quay and add more loading berths.

**Dock.**—The wet dock or basin is entered close to the ninety-first milepost. Its dimensions are: Length, 1,640 feet; width, 395 feet; breadth at entrance, 131 feet; depth in the basin,  $16\frac{1}{2}$  feet at zero; depth at entrance  $19\frac{1}{2}$  feet. There is a floating crane which will lift 40 tons and a fixed crane which will lift 10 tons. Vessels will be allowed to winter in the basin by payment of a fixed tariff for the amount of space they may occupy. A grain elevator which will store 25,000 tons has been erected.

**Hospital.**—A British mariner's bed in the Rumanian hospital has been instituted, which is supported by a contribution from every ship.

**Coal and supplies.**—About 20,000 tons of Welsh coal was in normal times usually kept in stock; 500 tons per diem can be loaded from lighters. Meat (except mutton), potatoes, and bread were plentiful. The water is not fit for drinking.

**Above Braila** a depth of 18 feet can be carried as far as Oltenitza, except during the months of October and November.

Vessels drawing not more than 11 feet can reach Giurgevo, opposite Rustchuk. Vessels drawing 17 feet can reach a point  $3\frac{1}{2}$  miles below that town.

A pilot for this part of the river can be obtained at Galatz.

**The Kilia** branch of the Danube has six principal entrances, viz, the Staroe Stambul, East Branch, Novoe Stambul, Peschani, Otnojni, and Ochakov Mouths. Besides these there are several others of small importance.

**Navigable depths.**—In the extreme north of the delta the Polu-nochnoe or Midnight branch has been deepened to a depth of about 12 feet and connects the Ochakov Mouth with the sea by a channel about  $1\frac{1}{2}$  miles long. Depths of from 12 to 40 feet can be carried up the Kilia Branch to its junction with the Sulina Branch, but its entrances, with the exception of the Midnight Branch, are blocked by sandbanks having only from 1 to 6 feet of water on them.

**Caution.**—In thick weather it is advisable not to stand into less than 10 fathoms between the Sulina Mouth and the various outlets of the Kilia Branch.

**Buoys.**—For the purpose of indicating the area within which fishing is prohibited, buoys have been established in 24 feet of water off the Staroe Stambul, East Branch, Novoe Stambul, Otnojni, Ochakov, Prorva, and Bielgorod Branches.

**Vilkov**, situated at the junction of the Bielgorod Mouth with the main Kilia Branch, is a fishing village of about 5,000 population and is the center of the fishing industry of the delta, from which the fish is despatched to Odessa. Regular communication is maintained by the Black Sea and Danube steamers with Kilia and Odessa; and the town is connected by telegraph with the Russian system.

There are two churches in the village. One, the Old Believers Church, having a white pointed steeple, is conspicuous from seaward and forms a good mark for making Ochakov Mouth.

**Kilia** (lat.  $45^{\circ} 27' N.$ , long.  $29^{\circ} 16' E.$ ), situated 16 miles above Vilkov, is a town of about 8,000 population, and is the highest point in the Kilia Branch to which regular steamship communication is maintained.

**Ismail**, situated on the left bank, 23 miles above Kilia and about 11 miles below Chatal d'Ismail, is a town of about 32,000 population and possesses a hospital with 30 beds. Vessels are moored close to the shore, enabling them to maintain communication by gang boards. The bottom consists of hard clay and sand.

The principal trade is in grain and timber, the Black Sea and Danube steamers maintaining communication with Odessa via Sulina.

Near Ismail, at the village of Starya Nekrasovka, is an obelisk situated in lat.  $45^{\circ} 20' 28'' N.$ , which is the south end of the Russo-Norwegian arc of a meridian of  $25^{\circ} 20'$ .

**Polunochnoe (Midnight) Branch.**—The dredged channel into this branch, with a depth of 12 feet in it, extends for a distance of 3,500 feet,  $2^{\circ}$  from the north entrance, and is 154 feet broad. It is marked on the western side of the approach by a black buoy exhibiting a fixed white light, and on the eastern side by a red buoy with bell, showing a fixed red light, thence by red buoys on the eastern and black buoys on the western side to the mouth of the branch.

The southern entrance to the Polunochnoe Branch is marked by buoys—two black buoys marking the western side and a red buoy the eastern side.

**NOTE.**—The lightbuoys are withdrawn in winter; also for a few days every 6 weeks in summer, to be recharged with gas.

**Range lights.**—Two masts, 980 feet apart, have been erected as leading marks on the western point of the north entrance to the

branch, 20 and 27 feet high, respectively, surmounted by black triangles, the front one point upwards, the rear one point downwards. A fixed red light is shown from the front mast and a fixed white light from the rear. These masts or lights in range  $182^{\circ}$  lead through the dredged channel. The depth in this dredged channel is liable to change.

**Signal stations.**—A signal mast stands on each side of the entrance to Polunochnoe Branch. From the eastern one, which has a yard, depth signals are shown. The western one is used for communicating with vessels in the roadstead.

**Depths signals.**—The depth on the bar of the entrance channel is indicated by balls hoisted at the yardarms of the signal mast, as follows: A large ball indicates 6 feet; a medium-sized ball indicate 1 foot; a small ball indicates 6 inches. A depth of  $12\frac{1}{2}$  feet would thus be indicated by a large ball at each yardarm with a small ball under one of them.

**Zhebriyani (Jibriani) Bay**, into which the Midnight Branch Falls is situated on the north side of the Kilia Delta and affords anchorage in from 2 to  $7\frac{1}{2}$  fathoms.

**Beacons.**—A mast 55 feet high, surmounted by a checkered square, has been erected in the village of Zhebriyani (lat.  $45^{\circ} 30' N.$ , long.  $29^{\circ} 38' E.$ ), which kept in range  $294^{\circ}$ , with Jibriani church steeple, a massive tower of a dark color, clears the shoals on the north side of the Kilia Delta, in 31 feet of water.

A mast 32 feet high, surmounted by a checkered ball, has been erected on the north point of Prorva Island, the northeastern island of the Kilia Delta.

**Volchek Light**, fixed white, 84 feet above high water, visible 15 miles, is exhibited from a mast on a brick foundation located at Volchek.

**Caution.**—Mariners are warned that the shoals outside the whole of the delta of the Danube have extended considerably, especially northward of Prorva Island, where the chart shows from  $8\frac{1}{2}$  to 9 fathoms on the above leading line instead of 31 feet, as reported.

**Fido Nisi or Serpent Island.**—This little island, named by the Greeks the Island of Serpents, bears  $78^{\circ}$  24 miles from Sulina old lighthouse, and is about 750 yards in length from northeast to southwest and  $1\frac{1}{2}$  miles in circumference. Its shores are composed of cliffs. There are several landing places, but the two best are those at the northeast and south ends of the island. Depths of from 2 to 4 fathoms extend about 70 yards from the western and southern shores. On the eastern and northeastern shores these depths enter to nearly 200 yards, and within these limits the bottom is foul.

**Fidonisti (Serpent) Island Light**, revolving white, 195 feet above high water, visible 18 miles, is exhibited from a white stone tower located on the summit of the island.

**Anchorage** may be found 600 yards south of the lighthouse in 11 fathoms with good shelter from winds between northeast and northwest.

**Coast.**—Beyond the Kilia mouths of the Danube the coast trends in a northeasterly direction for about 80 miles to Odessa, presenting more and more as that town is approached a flat surface of no great height, with a reddish perpendicular shore, and salt lakes appearing at intervals as far up as the mouths of the Dniestr. Of these, Kunduk Lake, to the northward of Zhebriyani, extends about 16 miles in a north and south direction, with general depths of 6 to 9 feet. The passage which connects it with the sea is usually closed by a shallow bar.

The 5-fathom curve on this extent of coast lies  $\frac{1}{2}$  to 1 mile from the shore except at a point about 10 miles northeast of Zhebriyani, where a bank with  $3\frac{1}{2}$  to  $3\frac{3}{4}$  fathoms extends  $2\frac{1}{2}$  miles from the shore; also north and south of Dniestr estuary, where it extends  $3\frac{1}{2}$  and 2 miles, respectively.

**Balaban Cliff** (lat.  $45^{\circ} 53' N.$ , long.  $30^{\circ} 15' E.$ ).—About 34 miles northeastward from Zhebriyani is the high cliff of Balaban, which may be seen from a considerable distance. It is sometimes called a cape, although not at all prominent, and when seen from seaward it appears isolated between two large salt lakes.

**Dneister Estuary.**—About 17 miles northeastward of Balaban is the entrance to Dneister Estuary, or Ovidio Lake, a large lagoon or salt lake, formed by the waters of the Dneister before they reach the sea. It is 22 miles in length from northwest to southeast,  $2\frac{1}{4}$  miles wide between Akerman and Great Otorek Point, and  $6\frac{1}{2}$  miles in its broadest part, with a depth of 4 to 9 feet; the town of Akerman and the villages of Kaloglei, Ovidiopol, Roksolyani, and Karolina on the northern shores.

The entrance to the Dneister Estuary, which may be recognized by a break of 5 miles between the cliffs, is formed by two tongues of sand with a low island in the middle, allowing the waters of the river a passage at either end. The channel to the northward is named the Ochakov Mouth and has a depth of about 3 feet, but is never used; that to southward is the Trasigrad Mouth.

**Communication.**—There is steamer communication between Akerman and Odessa; also between Akerman and Ovidiopol.

**Tsarigrad Mouth.**—The Tsarigrad Mouth is alone made use of by vessels entering the Dneister Estuary. It sometimes has a depth 10 to 12 feet but is much influenced by the wind.

**Lifeboat.**—A decked steam cutter and a 10-oared lifeboat are stationed at Bugaz, on the south side of the Tsarigrad Mouth. There is also a life-saving station at Ovidiopol.

**Buoys.**—The Tsarigrad Channel is marked by black and red spar buoys located on the north and south side of the channel. These buoys are not reliable.

There is a pilot station on the southern side of the entrance.

**Beacon.**—A black framework beacon, surmounted by a mast and a ball, is situated on the south side of the entrance northward of the pilot station.

**Dneister River Light**, alternating fixed and group-flashing red and white, 77 feet above high water, visible 14 miles, is exhibited from a white iron tower located on the south side of Tsarigrad Mouth.

**Fogsignal.**—The fogsignal is a bell located at the lighthouse.

**Range lights.**—A fixed red light, 24 feet above high water, is exhibited from a red beacon located in front of the east beacon.

A fixed white light, 56 feet above high water, is exhibited from a black mast located in rear of the west beacon.

**Caution.**—The channel entrance is subject to frequent change from the continuance of northeasterly or southwesterly winds, and the lights and beacons are altered as required. The channel is very narrow, and it is not prudent for a stranger to attempt it.

**Dneister River.**—The Dneister River, the entrance to which is situated 16 miles from the Tsarigrad Mouth, is navigable for vessels of 6 feet draft to Bender, 70 miles, at which place the railways from Jassy and Bucharest unite on the way to Odessa. Steamers ascend the river as far as Mayake, about 8 miles, towing loaded lighters.

The mouth was once dredged to a depth of 7 feet but has since silted up until now it has a depth of about  $4\frac{1}{2}$  feet. The fairway into the river is marked by white buoys on the right hand and red on the left hand.

**Depth signals**, to indicate the depth on the bar of the river, are made from a lookout house by means of balls, the larger ones each indicating a depth of 1 foot and the smaller ones a depth of inches.

**Light.**—A fixed white light, 35 feet above high water, is exhibited from a white mast located on the west bank of the entrance to the river.

**Range lights.**—A fixed red light, 35 feet above high water, is exhibited from a white mast located on the east bank of the entrance to the Dneister River.

A fixed white light, 42 feet above high water, is exhibited from a white mast located in the rear of the fixed red light on the east bank of the entrance to the river.

These lights in range  $120^\circ$  lead over the bar.

**Coast.**—From the Dniester Estuary to Cape Fontana, 19 miles, the coast consists generally of steep clay hills which are subject to frequent landslides.

**General directions.**—In turning to windward along the coast great attention should be paid to the lead as the variety of soundings has often occasioned shipwreck. All along this coast from the Kilia Mouths of the Danube to Odessa, depths of not less than 5 fathoms are to be found from  $\frac{1}{2}$  to 1 mile from shore, but northward of the mouths of the Dneister these depths will be found  $3\frac{1}{2}$  miles off. Thence along the coast to the northeastward the bank narrows gradually from the last-named distance to  $\frac{1}{2}$  mile from the shore when abreast the lake near the village of Lustdorf, which lies 3 miles to the southward of Cape Fontana.

**Off-lying banks.**—Exposed to the action of the current and the alluvial deposits of four great rivers, the Gulf of Odessa offers several very curious variations in depth, which might sometimes cause great uneasiness to the seaman in thick weather. The first bank is of large extent and lies from 7 to 10 miles  $103^\circ$  from the low island between Tsarigrad and Ochakov mouths. It has a depth of 6 fathoms, with 8 to 15 fathoms around it.

Near the northern end of this bank, and 9 miles  $86^\circ$  from Tsarigrad Lighthouse, is Morskaya Bank (lat.  $46^\circ 6' N.$ , long.  $30^\circ 41' E.$ ), with a depth of 25 feet; and  $3\frac{1}{2}$  miles westward of Morskaya Bank is a detached 5-fathom patch.

About 21 miles  $100^\circ$  from Tsarigrad Lighthouse and 22 miles  $159^\circ$  from Cape Fontana is another bank of 7 fathoms, with 12 to 15 fathoms around; and at 39 miles S. by E.  $\frac{3}{4}$  E. from Cape Fontana is a fourth bank, with a depth of 11 fathoms, and from 12 to 17 fathoms around.

**Buoys.**—A black spar buoy, with a cone, point upward, in about 5 fathoms, marks the north extreme of Morskaya Bank; and a red spar buoy in the same depth, with a cone, point downward, marks the south extreme of the shoal.

**Caution—Local magnetic attraction.**—From an investigation made in 1882 it has been reported that local magnetic disturbance exists in the space comprised between these off-lying banks and Odessa, and in consequence the compass error is increased on approaching that port. Caution should be exercised when navigating in this locality in thick weather; more to seaward the disturbance vanishes.

**Coast.**—On approaching Odessa the country appears covered with houses and mills. Two ravines will also be seen. In the first lies the Sukhoi Liman (the dry salt lake), which is of considerable extent, and the village of Lustdorf occupies the other.

A very conspicuous mill, with several church spires and domes, may be seen as Odessa Bay is neared, and the lighthouses on Cape Fontana will be concealed from view by a projection of the land named Little Fontana.

**Cape Fontana** (lat.  $46^{\circ} 23' N.$ , long.  $30^{\circ} 45\frac{1}{2}' E.$ ).—This cape, situated about 6 miles southward of Odessa, rises perpendicularly 124 feet above the sea. On it is a white cylindrical stone lighthouse 65 feet in height, which is now disused. Near the lighthouse is a monastery.

**Cape Fontana Light**, fixed white, 212 feet above high water, visible 21 miles, is exhibited from a white cylindrical iron framework tower located about 2 miles south of the town.

**Fogsignals.**—A fog siren and a bell are in operation.

**NOTE.**—For the convenience of passing vessels, adjusting their compasses, it may be noted that Kovalev water tower when in range with Cape Fontana old lighthouse bears  $246^{\circ} 25'$ , and Cape Fontana new lighthouse when in line with the old lighthouse bears  $33^{\circ} 15'$ .

**Shoals.**—Shoal ground with depths of 6 to 21 feet extends 1 mile southwestward of Cape Fontana. A rocky patch of 14 feet lies with Cape Fontana old lighthouse bearing  $234^{\circ}$ , nearly 1,400 yards, and nearly  $\frac{1}{2}$  mile from the shore. Vessels are accordingly recommended to give the cape a wide berth.

**Langeron Point**, situated 6 miles to the northward of Cape Fontana, forms the southern extremity of Odessa Bay.

**A bank**, with 9 feet water, nearly 600 yards from the shore, is situated to the southeastward of Langeron Point.

Vorontzovski lighthouse, in range with Holy Cross Church, at Peresip, bearing  $N. 30^{\circ} W.$ , leads about 800 yards to the eastward of this shoal.

**Odessa Bay.**—The Bay of Odessa is extensive and the depth of water quite sufficient for the largest ships, but it is more or less exposed to the two most dangerous winds that blow on the coast—those from the south and southeast.

The northerly wind, which blows in the summer, although less injurious to vessels, is extremely unpleasant to the inhabitants of the town, since, especially during the hot days of July and August, it brings the dust from the parched plains and steppe, occasioning insufferable heat, which is only slightly diminished in the evening. Vessels lying in the bay should always keep their spare anchors ready to let go as they may part in the heavy squalls.

The sandy plain of Peresip, at the head of the bay, is formed between two salt lakes, separated by some table-land. A suburb of Odessa stands on the plain to the northward of the town. From thence the shore curves to the northeast, toward Dembrovsk, or East Point, which bears  $37^{\circ}$  5 miles from Langeron Point. The greatest

depth at the entrance of the bay is 8 fathoms, which gradually decreases to the shore, but vessels of light draft in turning to windward should not stand toward Peresip Beach into less water than  $2\frac{1}{2}$  fathoms, which depth will be found  $\frac{1}{2}$  mile distant and also take care to avoid the rocks and foul ground that extend to the southward of Dembrovsk Point.

**Shoal.**—A shoal, with 18 feet water, lies about  $1\frac{1}{2}$  miles south of Dembrovsk Point, with Reidovi (Vorontzovski) Molehead Lighthouse bearing  $238^\circ$ ,  $2\frac{1}{8}$  miles, and Holy Cross Church  $289^\circ$ . A red spar buoy, with inverted cone topmark, is moored in 24 feet on the south side of this shoal.

**Lifeboats and rescue stations.**—About  $3\frac{1}{2}$  miles to the eastward of Dembrovsk Point, on the neck of land separating Dovinovka Lake from the sea, a rescue station has been built and lifeboat established. The bell of the rescue station may be heard during fogs, but is not worked or intended as a fog signal.

A lifeboat is also stationed near Vorontzovski Lighthouse, and there is a refuge on Platonovski Mole, Odessa Harbor.

**Harbor.**—The harbor located on the southwestern side of the bay is divided into an inner and outer.

The inner harbors are formed by five moles dividing the bay into four parts. The two western moles form the Imperial or Pratique Port, and the two eastern moles, the Quarantine Port, the intervening space with its center mole forming New and Middle Harbors and affording extensive quayage.

The outer harbor is formed by the prolongation of the eastern mole (Karantinni), about 700 yards in a northeast and northwest direction, forming an arch to the eastward. This portion is named the Reidovi Mole; also by a breakwater about 1,400 yards in length, parallel to the shore, with a channel between its eastern extremity and Reidovi Mole about 300 yards in width, and in which there is a depth of 24 to 30 feet of water. The channel between the western extremity of this breakwater and Pratique Port Moles is about 300 yards in width and has a depth of 17 feet. The breakwater forms a safe and commodious port, protected from all winds and without tide, but the height of the water is slightly affected by the winds.

Mooring bollards are placed at convenient distances along the harbor face of the breakwater to which vessels secure their stern fasts, and there are several mooring buoys in the harbor for the convenience of shipping; also high and low level railways and large elevators for loading grain. The harbor is lighted by electricity.

Three-fourths of a mile northwestward of the port at Peresip is the petroleum harbor, sheltered from the northward by a long mole.

**Odessa Light**, fixed and flashing red, 63 feet above high water, visible 13 miles, is exhibited from a white iron tower located on the



extremity of Vorontzovski Mole, the prolongation of the old quarantine mole.

**Fogsignal.**—The fogsignal in use is a siren, but a bell will be sounded if the siren is not functioning.

**Lights.**—The Volnolom or breakwater is marked by a fixed green light on the eastern extremity and a fixed white light on the western extremity.

**Anchorage.**—The road comprises all the bay within a line joining Vorontzovski Lighthouse and Dembrovsk Point. The bottom consists principally of soft mud with sand and shells.

Vessels can anchor in the road or in the outer harbor to await the visit of the port authorities.

**Prohibited anchorage.**—A submarine cable in connection with the electric lighting is laid between the breakwater and the Reidovi Mole, and vessels are prohibited from anchoring near it. The positions of the ends are marked by posts, painted black and yellow and surmounted by boards having the word "Kaõerl" on them.

The quarantine port is formed by the Karantinni Mole, 870 yards in length, arched to the northwest, and the Platonovski Mole, 370 yards in length, which is curved toward the head of the former. The entrance is 200 yards in breadth, and the port is dredged to a depth of 24 feet with 28 feet alongside the quays.

A pile, showing about 2 feet above water, is situated about 320 feet to the eastward of Karantinni Mole.

**New Harbor**, situated between Platonovski Mole and New Mole, has been dredged to a depth of 26 feet.

**Middle Harbor**, west of New Harbor, has been dredged to a depth of 21 feet, and vessels can load, protected by the breakwater, all along the quays.

**Pratique (Imperial) Port.**—At the distance of  $\frac{1}{2}$  mile northward of Platonovski Pier and beyond the grand staircase which reaches from the upper part of the city to the quay, near a second ravine, lies the Voenni Mole, about 440 yards in length, forming, with Androsovski Mole and its continuation at right angles named Potapovski Mole, the Imperial port used by coasting vessels and steamers engaged in regular service between Odessa and other Russian ports in the Black Sea. The entrance between Potapovski and Voenni Moles is 65 yards in width and the port is dredged to a depth of 16 feet.

Westward of Potapovski Mole a breakwater 400 yards along extends from the shore with an arm to the southeastward 500 yards in length.

**Petroleum Harbor**, formed by a mole 900 yards in length, with an arm 235 yards long projecting to the southward from its outer end, has an extreme depth of 24 feet.

**Lights.**—The various moles are marked by lights. (For details, see Light List.)

**Pilots.**—The employment of pilots is not compulsory. There is a pilot station in the quarantine harbor for the pilots of the Nikolaev Co., who are authorized by Government to pilot vessels between Odessa and Ochakov. A special pilot is employed to berth vessels in the harbor.

There is a pilot signal station on the quarantine mole. It is visible from seaward and by day flies the Russian pilot flag. Vessels' signals will be received and answered free of charge, the agents being communicated with by telephone.

**Tugs.**—There are several tugs stationed at Odessa. There is a fixed scale of charges.

A steamboat fitted with a powerful centrifugal pump is available for fire-extinguishing purposes.

**Ice breaker.**—When the port freezes, the ice breaker, which is also a salvage boat, keeps the passages open and brings in and takes out vessels. Payment is exacted for salvage work or for attendance upon vessels.

**Odessa.**—This city, situated on the southern shore of the bay, though not immediately at the mouth of any great river, is only 30 miles from the channel or estuary receiving the streams of the Dniepr and the Bug and about the same distance from the mouth of the Dniestr. It is likewise well situated with regard to the Danube, being little more than 95 miles from the Sulina Mouth, and has clear navigation to the Bosphorus. An artificial harbor has been built which accommodates a large number of vessels.

The city, the fourth in size in the Russian Empire, and situated upon a hill, which descends rather abruptly toward the sea, has a pleasing aspect both from the interior and the sea. In the direction of the sea it is ornamented by a row of splendid houses, between which and the edge of the cliff is a handsome walk, planted with trees. The cathedral, situated near the center of the city, has a tall spire which is visible for a distance of 18 miles when coming from the eastward.

A magnificent flight of steps, about 50 to 70 feet broad, leads down the cliff declivity, 80 feet high, to the shore and harbor. The blocks of stone of which the steps are composed are supported by arches, and the space between is open for traffic. There are both steam and horse tramcars in the thoroughfares and to the environs.

In 1919 Odessa had a population of 613,000.

**Floating dock.**—There is a pontoon dock which is 381 feet long, 63 feet wide (inside), and has a depth of 19 feet 8 inches over the blocks. The lifting power is 4,800 tons. It can be used in two parts, lifting 2,740 and 2,060 tons, respectively.

**Patent slips.**—There are two patent slips at Odessa, which will accommodate vessels of 1,100 and 700 tons, respectively, if less than 245 feet in length and 8 feet draft. Vessels are hauled up broadside on. The largest vessel taken on the slip was a steamer of 1,214 tons (gross), 240 feet in length, 35½ feet beam, and maximum draft when hauled up 8 feet. Several vessels can in this manner be hauled up and placed alongside one another.

**Repairs.**—There is a foundry and machine factory where small steam vessels are constructed. There are several repairing shops, but no large forgings can be made nor are heavy plates or angles kept in stock. A Government floating crane, with a lifting power of 30 tons, is available.

**Communication.**—By rail to Bukarest, Moscow, Vienna, Warsaw, and the European system generally. There is regular steamship communication with the principal British and continental ports; also with ports in the Black Sea, Grecian Archipelago, and with Alexandria. With Constantinople there is an almost daily service. Five steamship companies trade regularly between Odessa and ports in the Far East. There is telegraphic communication with all parts of the world.

**Coal and supplies.**—In normal times the importation of Russian coal from the Sea of Azov was greatly on the increase, with a consequent falling off in the supply of English coal. About 50,000 tons of Russian (Donetz) coal was usually in stock, also about 7,000 tons of North Country coal. Coaling is usually performed alongside a quay, with depths of from 12 to 26 feet, or by lighters, and is in no way impeded by wind or sea.

Supplies of all kinds could be obtained, fruit and vegetables in their seasons being exceedingly good.

**Water.**—The water supply for the city is brought in pipes from the Dniestr, and the waterworks, which are on a gigantic scale, in 1886 distributed 1,520,000,000 gallons of filtered water through 220 miles of pipes.

**Hospital and quarantine.**—There is a Russian hospital and a British seamen's home.

Every non-Russian vessel, even though not coming from a suspected place, is sent to this port, and special limits are assigned for those who have to undergo quarantine.



## CHAPTER VI.

### BLACK SEA—NORTHERN SHORE, ODESSA TO KERTCH STRAIT.

**Coast.**—From Dembrovsk Point the coast trends eastward for 23 miles to Adzhiyask Point, and curves slightly to the northward, forming a long bay. The shore is of moderate height, steep, and of a reddish appearance, but a few lakes, separated from the sea by small bars of sand, and several villages, break its uniformity.

Dofinovka, the first of the above-mentioned lakes, about  $3\frac{1}{2}$  miles to the eastward of Dembrovsk Point, is separated from the sea by a low sandy isthmus, on which is a line of telegraph posts and a lifeboat station.

Off this coast a depth of 5 fathoms will be found from 1 to  $1\frac{1}{2}$  miles. Inside the 5-fathom line the soundings are irregular, more especially in the vicinity of the Trutaeva Bank,  $4\frac{1}{2}$  miles west of Adzhiyask Point. Off the coast, from 3 to 8 miles, is an irregular bank named Odessa Sand Bank.

**Odessa Sand Bank** extends to the westward from Kinburn Spit to within 9 miles of Odessa, with irregular depths of 14 to 30 feet on it. Off the western extremity is a patch of  $3\frac{1}{2}$  fathoms, sand and shells, extending in a northwesterly and southeasterly direction about 400 yards; and about  $\frac{3}{4}$  mile to the eastward of it is another patch of  $3\frac{1}{2}$  fathoms. Between and eastward of these patches the depth increases gradually, but to the westward of the former it suddenly increases to 10 fathoms.

The depths to the southward of the bank increase gradually from 3 to 5 fathoms, thence to 12 fathoms from 4 to 5 miles farther south.

The channel to the westward of the bank, which is maintained by the united currents of the Dneipr and Bug, carries a depth of 11 to 12 fathoms, and that to the northward leading to Kherson Bay, known as the Military Channel, of from 5 to 10 fathoms, over a bottom of mud and shells, with the exception of a patch of 24 feet lying in the fairway,  $2\frac{3}{4}$  miles southeastward from the entrance to Nehmetskaya Valley, and a 5-fathom patch lying nearly 1 mile northward of it.

**Buoys.**—A black and white spar buoy, surmounted by a black ball, stands on the 24-foot patch near the western extremity of Odessa Bank.

The northern edge of the Odessa Bank is marked by four black spar buoys, surmounted by triangles, points upward—No. 1 in lat.  $46^{\circ}$

33' 0'' N., long. 31° 3' 45'' E.; No. 2 in lat. 46° 33' 55'' N., long. 31° 9' 45'' E.; No. 3 in lat. 46° 34' 00'' W., long. 31° 18' 20'' E.; and No. 4 in lat. 46° 33' 30'' W., long. 31° 21' 45'' E.

**Lightbuoy.**—A buoy exhibiting a group flashing red light is moored in the most northerly bight of the 10-fathom curve,  $2\frac{1}{4}$  miles 292° from the life-saving station at New Dofinovka.

A buoy exhibiting a fixed red light is moored in 4 fathoms,  $1\frac{1}{2}$  miles 156°, from the coast-guard station situated on an elevation on the shore to the east of Tiligulsk Lake.

A red buoy is moored in 24 feet water,  $\frac{1}{2}$  mile to the southward of Adzhiyask Point.

**Caution.**—The buoys in this channel can not be depended upon as they are liable to drift out of position.

**Berezan Island.**—The coast between Adzhiyask Point and Ochakov Point, 8 miles farther east, recedes considerably to the northward. Between is the Island of Berezan, about  $\frac{1}{2}$  mile in length from north to south and 1 mile in circumference. The shores of Berezan Island are steep and of a reddish tint. The southern point is high. From thence the island falls toward the northward and terminates in a low point on which boats can land. From its south extreme a reef extends nearly  $\frac{1}{2}$  mile southeastward, whilst it is joined to the shore on its north side by a shallow bank. There is a depth of about 14 feet  $1\frac{1}{4}$  miles from its eastern side, and good anchorage will be found at that distance to the westward of it.

**Beacon.**—A wooden beacon, 54 feet in height, surmounted by a latticework square and painted black, stands on the south extreme of Berezan Island.

**Buoy.**—A conical buoy with spherical topmark, painted red, moored in 25 feet water, marks the outer edge of the reef extending southward from Berezan Island.

A short distance westward of this buoy is a red spar buoy surmounted by an upturned broom.

**Berezan Island Light**, group occulting red, is exhibited from a red buoy moored on the point of the shoal south of the island.

**Fogsignal.**—The fogsignal is a bell rung by the motion of the waves.

**Range mark.**—On Ochakov Heights, near the western shore, are two mast beacons—the northern, black, faced with a latticework triangle and surmounted by a ball, and the southern beacon, also black, surmounted by a latticework square. The northern beacon in range with Ochakov signal tower 74° leads southward of the shoal water off Berezan Island and northward of Kinburn Spit.

**Berezan Liman**, northward of Berezan Island, extends about 14 miles to north-northeast. Seven miles within the entrance is a branch extending to northeastward, which forms the estuary of the Zaseck

River, whilst at the head of the main branch is the Berezan River. Neither of these rivers is of any importance, being dry in the summer. On the shores of this inlet are numerous villages, but the only one visible from seaward is Viktorovka, situated on the western side near the entrance in a ravine running in a north and south direction.

Beikuch Liman opens into Berezan Liman on the eastern side of the entrance, and at its head is the town of Beikuch.

**Bar.**—The entrance to the liman, nearly 800 yards wide, lies between a low point northeastward of Berezan Point and Berezan Spit. The bar has depths of 10 to 11 feet, within which the water deepens to 30 feet, but shoals again to an inner bar with a depth of 18 feet over it. Above this, as far as Kaze village, the navigable depth is from 20 to 33 feet.

**Beacons.**—About  $\frac{1}{2}$  mile northeastward of Berezan Point is a black beacon, elevated 38 feet above the sea, consisting of a mast supported by wooden stays and surmounted by a St. Andrew's cross, and 1,300 yards  $320^\circ$  from this beason is a similar beacon, also black, with a topmark consisting of six horizontal bars, elevated 44 feet above the sea.

**Directions.**—Small craft of 6 feet draft can enter Berezan Liman, by keeping these beacons in range bearing  $320^\circ$ , afterwards passing between the black buoys on the starboard hand and the red buoys on the port.

**NOTE.**—Viktorovka range lights and Suvorov light, which are situated near the entrance to Berezan Liman, are to facilitate entrance to Kherson Bay.

**Kherson or Dniepr Bay.**—This extensive bay, or arm of the sea, is upward of 30 miles long in an east and west direction and from 3 to 8 miles in breadth. Receiving, as it does, the waters of the Dniepr and the Bug Rivers, which discharge their turbid streams into a tideless estuary, it is shallow for the most part, but a channel of 25 feet has been dredged to allow access to the Bug River, on which, at Nikolaev, a large Russian dockyard and shipbuilding establishment is situated.

The entrance to Kherson Bay is between Ochakov Point and Kinburn Spit, and the approach is either northward of the Odessa Sand Bank, where the least water is 28 feet, until well within the points of entrance; or from the southwestward, between the eastern edge of the Odessa Sand Banks and the shallow water extending from Kinburn Spit, where not more than 19 feet can be depended on.

**Bottom.**—In the deeper part of Kherson Bay and the Bug River the bottom is soft mud, except where cross sand ridges are forming. The shoals at the mouth of the Dneipr River are of hard sand.

**Currents.**—In Kherson Bay and in the Dneipr and Bug Rivers the strongest outward stream, caused by the melting of the snows, will

be found in April and May. It is said the current never exceeds 2 knots. In the fall of the year it is but slight in Kherson Bay and uncertain in direction in the River Bug, where it is influenced by the prevailing wind.

**Water level.**—The water level is highest from April to June and lowest in the autumn. Fresh winds raise or lower the water about 1 foot in Kherson Bay and 3 feet in the Bug River.

**Pilots.**—Pilotage is compulsory for merchant vessels bound to ports in Kherson Bay or in the Bug River. Pilots are stationed at Ochakov and Nikolaev.

**Ice breakers.**—The channels to Nikolaev and Kherson are kept open throughout the winter as far as possible by means of ice breakers.

**Ochakov.**—Ochakov Point on the north side of the entrance to Kherson Bay, lies  $5\frac{1}{2}$  miles to the eastward of Berezan Island. On it is a large battery, above which is the town of Ochakov, visible from a distance of 15 miles. The most conspicuous objects are the church, the chimney of the brickworks, and the signal station—a yellow stone tower with mast and yard.

**Signal station.**—Telegrams will be received from vessels at the signal station by International Code and forwarded to their destination, to be paid for on delivery.

**Depth signals.**—The depth in the dredged channel is shown from the signal station.

**Storm signals** are shown from the signal station.

**Pilots' stations.**—The pilots' watch house is situated on a mound on the eastern side of Ochakov Point; by day it flies the pilot flag.

**Pratique.**—Vessels bound for Nikolaev are boarded at Ochakov by the health and customs officers. The latter seal the hatches, and there is a penalty for each seal broken before arrival at destination.

**Lifeboats.**—There are two lifeboats stationed on the eastern side of Ochakov Point; one of them is fitted with runners. At Fort Nikolaev there is a lifeboat on runners.

**Pier.**—The quarantine pier, on the eastern side of Ochakov Point, has depths of from 6 to 8 feet alongside.

**Kinburn Point.**—The southern coast of Kherson Bay is low and sandy and terminates to the westward in Kil Burun or Kinburn Point, which is low, narrow, and subject to inundations. The extremity of the spit extending from Kinburn Point lies nearly  $2\frac{1}{2}$  miles  $258^\circ$  from Ochakov Point and forms the southern side of the entrance to Kherson Bay.

**Beacon.**—Near the extremity of Kinburn Point is a black iron framework beacon, surmounted by a ball and elevated 37 feet above the sea.



**Kinburn Spit—Buoys.**—A shoal or spit with 1 to 2 feet least water extends  $1\frac{1}{2}$  miles northwestward of Kinburn Point, the extremity of which is marked by an automatic whistlebuoy, painted black. In winter it is replaced by a black spar buoy with flag.

The northeastern edge of the point of the spit is marked by three black spar buoys with black flags.

**Fort Nikolæv.**—An artificial islet is situated nearly  $1\frac{1}{2}$  miles to the eastward of Kinburn Point. On it stands a battery, known as Fort Nikolæv.

**Anchorage.**—Vessels can anchor eastward or westward of Ochakov Point, according to their draft. Vessels must avoid anchoring on the line of the leading lights or beacons.

**Prohibited anchorage.**—A telegraph cable connects Ochakov with Fort Nikolæv. The route is marked by spar buoys surmounted by flags. Anchorage is prohibited in the vicinity of this cable; also in a space northeastward of the fort, near the entrance to the dredged channel, the limits of which are shown on the chart.

**North Coast—Ochakov Point to Adzhigiol Point.**—Between Ochakov Point and Adzhigiol Point,  $10\frac{1}{4}$  miles, the northern coast of Kherson Bay trends to the northeastward and eastward, forming a bay the shores of which are high and composed of clay. In this bay are several villages; and 2 miles westward of Adzhigiol Point are situated two white lighthouses.

**Lightbuoy.**—A white lightbuoy, showing a red, blue, and yellow fixed light, is moored 400 yards eastward of Ochakov Pier.

**Adzhigiol Point** (lat.  $46^{\circ} 37' N.$ , long.  $31^{\circ} 49' E.$ ), situated to the southward of Adzhigiol Valley, is low and marshy. A bank extends to the southward of the point as far as the dredged channel, which here divides into two branches, one leading into the Bug River, and the other to Stanislav and the Dneipr River.

**South Coast—Kinburn Point to Prognioisk village.**—The south coast of Kherson Bay trends southeastward for  $3\frac{1}{2}$  miles, then to eastward for 7 miles, when it again trends southeastward, forming a low, sandy point, on the eastern side of which, and opposite Adzhigiol, is the village of Skadovka.

**Prognioisk village**, 4 miles farther to the southeastward, has a church, and a pier where salt is loaded. Eastward of this village, a low narrow point, covered with reeds, extends 1 mile in a northwesterly direction, forming opposite the village a bay sheltered from the swell, where small vessels can anchor in from 5 to 6 feet of water.

**Buoys and beacons.**—A black spar buoy is moored about 3 miles  $309^{\circ}$  and a red spar buoy  $2\frac{1}{10}$  miles  $309^{\circ}$  from the church to mark the approach. Both buoys are surmounted by flags. The black buoy

should be left on the starboard hand and the red buoy on the port when steering toward the anchorage.

Two mast beacons have been erected on the shore, 840 yards apart. The front beacon is 41 feet above the level of the sea and surmounted by a triangle, base upward. The rear beacon is 45 feet above the sea and is surmounted by a triangle, base downward. In range 130° these beacons lead up to the anchorage.

**Kherson (Dniepr) Bay Light**, fixed white, 120 feet above high water, visible 17 miles, is exhibited from a white quadrangular iron pyramid located at Upper Victorovski on the heights at the west side of Berezan Lake.

**Beacon**.—A black beacon, consisting of a mast carrying a rectangular framework and surmounted by three short horizontal cross-pieces, stands close to the lighthouse.

**Light**.—A fixed red light, 48 feet above high water, is exhibited from a white quadrangular iron pyramid located at Lower Victorovski, on the cliff Berezan Guard, east side of Berezan Lake,  $2\frac{1}{2}$  miles 135° from rear light.

**Beacon**.—A black pyramidal beacon with spherical topmark stands close to the lighthouse.

These lights or beacon in range 319° lead through Ochakov Channel eastward of Kinburn Spit.

**Suvorov Light**, fixed white, 147 feet above high water, is exhibited from a white house located at Suvorov on a mound, north side of Kherson (Dniepr) Bay.

This light is visible in its full brightness between the bearings 12° and 45° or within the limits of safe navigation in the southwest approach to Kherson Bay for vessels drawing 15 feet.

Near the shoals on both sides the light decreases in brightness.

**Caution**.—Four powerful lights are shown in the town of Ochakov. Mariners are cautioned not to confuse these with Suvorov Light.

**Range lights—Fort Nicolaev**.—A fixed red light, 45 feet above high water, is exhibited from a white iron framework tower with a central column located on Fort Nicolaev at the entrance to Dnieper Bay.

A fixed red light, 63 feet above high water, is exhibited from an iron framework tower located 64 yards 92° from the front light.

The lights in range lead through Ochakov Channel from the line of the Viktorovka Lights to the line of the Adzhigiol Lights.

**Fogsignal**.—The fogsignal is a bell.

**Adzhigiol**.—A fixed red light, 112 feet above high water, is exhibited from a red square masonry tower located near the upper telegraph station.

A fixed white light, 170 feet above high water, is exhibited from a white square masonry tower located 1,380 yards  $69^{\circ}$  from the front light.

After leaving the range of the Fort Nicolaev Lights these lights in range lead up to the dredged channel.

**Beacon.**—A beacon stands behind the western lighthouse to render the leading line more visible by day. It consists of two masts with stays, 42 feet in height, each surmounted by a half sphere, base vertical, between which the eastern lighthouse can be seen.

**Ochakov dredged channel,** extends from a short distance eastward of Ochakov Point to abreast of Volosh Point in the Bug River, 21 miles, and is divided into five reaches. This channel is 330 feet wide at the bottom and has a least depth of 25 feet. Vessels drawing more than 24 feet 4 inches are not allowed to use it.

**Beacons and buoys.**—From the automatic whistlebuoy off Kinburn Spit to abreast of Ochakov Point the channel is marked on the starboard side by black spar buoys with black flags, and on the port side by red conical buoys, and by red spar buoys with inverted cone topmarks.

The dredged channel is marked by black spar buoys surmounted by upright cones on the starboard (southern and eastern) side, and by red spar buoys with inverted cones on the port (northern and western) side. The spar buoys are placed in pairs, 1,000 yards apart, except at the bends, where the distance between them is lessened.

**Lights.**—Three buoys, exhibiting red lights, mark the northern side of the second reach.

Two buoys, exhibiting fixed white lights, mark the west and east end, southern side of the second reach.

A buoy, exhibiting an occulting white light, is moored on the south side of the channel about the middle of the second reach.

**Lightbuoy.**—A red buoy with a pyramidal tower and exhibiting a group occulting red light is moored 1,500 yards  $143^{\circ}$  from Sari Kamishi Beacon, in 20 feet, at the junction of the third and fourth reaches of the channel.

These lightbuoys can not be depended upon.

**Depth signals.**—The least depth of water in the channel from Ochakov to the Bug River is indicated at the signal stations at Ochakov and Parutino by means of the undermentioned signals hoisted at the yardarms of the flagstaff, thus:

A black triangular shape indicates a depth of 21 feet.

A black rectangular shape indicates a depth of 23 feet.

A large ball in addition to the above indicates that 1 foot should be added.

A small black ball on the opposite yardarm indicates an additional 3 inches.

A red triangular flag will also be hoisted on the flagstaff when the depth in the channel is decreasing or when the ice in the river estuary is moving, and a white triangular flag when the depth in the channel is increasing or the ice is stationary.

The above signals will be repeated from a flagstaff, 56 feet high, erected on Volosh Spit.

**Dredging.**—The area in which dredgers are working is usually marked by white buoys. Vessels drawing less than 15 feet of water should leave the channel and pass northward of the dredger. Vessels of greater draft should give three prolonged blasts on the whistle and reduce speed. The dredger will then get as far as possible out of the fairway.

**Directions—Odessa to Kherson (Dneipr) Bay.**—In proceeding from Odessa to Kherson Bay, northward of Odessa Bank, steer to eastward until Dembrovsk Point bears  $0^{\circ}$  (north) to clear the shoals in the northern part of Odessa Bay; thence northeastward, in 8 to 10 fathoms, until the coast guard station near the western shore of Ajaliksi Lake bears  $0^{\circ}$  (north)  $2\frac{1}{4}$  miles, taking care to pass to northward of the 24-foot patch, marked by a spar buoy, located westward of Odessa Bank. An  $83^{\circ}$  course may then be steered toward Adzhiyask Point, passing to northward of the buoys marking the northern edge of Odessa Bank and to southward of the lightbuoy marking the southern edge of Trutaeva Bank. When Adzhiyask Point bears  $0^{\circ}$  (north) 1 mile, steer  $94^{\circ}$  until the black beacon on the southern extremity of Berezan Island bears  $0^{\circ}$  (north) 1 mile, from which position the signal station and the beacon on Ochakov Point should be in range. Proceed northeastward on this range, taking care not to deviate too far to the eastward and run afoul of Kinburn Spit until Upper and Lower Viktorovka Lights are in range; thence  $134^{\circ}$ , with these lights in range astern, until Fort Nicolaev Lights are in range; thence  $92^{\circ}$  on that range until the Adzhigiol Lights and the beacon, located in the bight in the extremity of Kinburn Peninsula, are in range; thence  $70^{\circ}$  on that range until the western entrance of the dredged channel, marked by a fixed red light on the northern side and a fixed white light on the southern side, is reached; thence eastward in the channel between the two lines of buoys marking it.

**By night.**—To enter Kherson Bay by night, approach the Surov Light within its arc of bright white light, and when Viktorovka Lights are in range, steer in, keeping them in one astern, until the lights from Fort Nikolaev are in range, when they must be steered for; then Adzhigiol Light in range will lead through the channel until the western entrance of the dredged channel is reached, when an easterly course will lead through the dredged channel between the

light buoys. Pilotage is compulsory when a vessel is eastward of the meridian of Suworov Light.

**River Dniepr approach.**—The southern shore of Kherson Bay trends to the eastward from Prognosk and continues low and sandy. Nearly opposite Cape Stanislav, on the northern shore, are the low islands Verbki and Yanushov, the latter being recognizable by the trees on it.

Northeastward of Verbki the shore bank extends  $1\frac{1}{2}$  miles from the west and is steep-to, there being a depth of 40 feet between it and the bank extending from the opposite shore. From Yanushov Island the shore trends to the east-southeast for 6 miles as far as to Zburev Bay, the entrance to which is blocked with reeds.

**Fogsignal.**—A fog bell is located on Verbki Island.

**Northern shore.**—From Cape Publikov, on the eastern side of the entrance to the Bug River, the coast trends eastward and southward to Cape Stanislav, forming a bay in which is the village of Alexandrovka.

**Cape Stanislav** is salient and steep and has a large village with a church and several mills situated on it.

A bank, with less than 6 feet of water, extends 1 mile south-southwest from the cape.

**Fogsignal.**—A fog bell is located on Cape Stanislav.

**Kizim Point**, on the north side of the Rvach Entrance to the Dniepr, which is steep and of a reddish color, bears  $92^\circ$ ,  $7\frac{1}{2}$  miles from Cape Stanislav, the coast between being high and forming a bay in which are the villages of Shirokaya and Sofievka.

**Kherson dredged channel.**—This channel, which has a width of 350 feet and a least depth of 24 feet, branches off from the Ochakov Channel abreast of Adzhigiol Point and runs  $68^\circ$  for  $12\frac{1}{2}$  miles until northward of Verbki Island, thence from southward of Cape Stanislav, for 6 miles  $76^\circ$  to the Rvach lightvessel, where it turns to the eastward and southeastward into the Rvach Entrance to the Dniepr.

**Buoys.**—The first reach of the channel is marked with black spar buoys with black flags on the southern side, and red spar buoys with red flags on the northern side, placed in pairs about 1,500 yards apart.

The second reach, known as Rvach Channel, is also marked by spar buoys placed in pairs, white on the southern side and red on the northern side.

**NOTE.**—The dredged channel from Adzhigiol Point to Stanislav Narrows is not lighted at night.

**Rvach Lightvessel**, exhibiting two fixed white lights, has a black hull and two masts and is located in lat.  $46^\circ 32' 30''$  N., long.  $32^\circ 16' 50''$  E., at the entrance to Rvach Channel.

**Range lights.**—A fixed red light, 46 feet above high water, is exhibited from a white stone dwelling with a tower located on Kizim Point near Kasperovka.

A fixed white light, 91 feet above high water, is exhibited from a red stone tower located about 1 mile  $76^{\circ}$  from the front light.

These lights in range, bearing  $76^{\circ}$ , lead through the dredged channel from Cape Stanlisav to the entrance of Rvach Channel.

A fixed red light, 28 feet above high water, is exhibited from a black mast with a topmark located on the low islets near Kizim Point.

A fixed white light, 50 feet above high water, is exhibited from a black mast with a topmark located on Kizim Point  $96^{\circ} 30'$  from the front light.

These lights in range, bearing  $98^{\circ}$ , lead from Rvach Lightvessel at the entrance of Rvach Channel to the entrance of the Rvach river.

**River Dniepr.**—The Dniepr River flows into Kherson Bay by nine mouths, which form clusters of islands covered with reeds and mostly uninhabitable. The mouths actually used are the northernmost, known as the Rvach Entrance, and the Zburev Entrance,  $3\frac{1}{2}$  miles to the southward of it.

The Dniepr is connected through the Prypot River to the Búg River by a channel.

**Ice.**—The river is frozen for about two months, from the middle of December to the middle of February. Sometimes a strong south wind will break up the ice during this interval, but with the returning wind from the northward it soon again becomes frozen over.

The Kherson and Rvach dredged channels are now kept open, so far as possible, by means of ice breakers.

**Rvach Entrance**, which opens immediately southward of Kizim Point, is formed by two dikes running out into the bay in a north-westerly direction, the southern having a length of 1,260 yards and the northern one being 875 yards in length.

**Depths.**—The Rvach Entrance and the river have been dredged to a depth which permits of vessels drawing 22 feet of water reaching Kherson. In the spring, when the river is high, vessels drawing more than 22 feet can use the channel, special permission being obtained in each case from the chief of the port.

**Bielogrudov Entrance** (lat.  $46^{\circ} 30' N.$ , long.  $32^{\circ} 18' E.$ ) opens to the northward of the bay of the same name.

The pilot police station, a yellow house with a green roof, stands on the northern side of the entrance.

**Depths.**—This branch of the river has a depth of about 10 feet when the water is low and is used by vessels of light draft.

**Depth signals.**—The depth of the water in the Bielogrudov Entrance is shown from the Bielogrudov Post and Dniepr Quay as follows:

Each long cylinder indicates a depth of 10 feet.

Each short cylinder indicates a depth of 1 foot.

Each ball indicates a depth of 3 inches.

A white flag below the signal indicates that the tide is rising. At slack water no flag is hoisted.

**Lightvessel.**—A lightvessel, exhibiting two fixed white lights, having a white hull, two masts with a black ball at each masthead, is located in lat.  $46^{\circ} 30' 40''$  N., long.  $32^{\circ} 12' 10''$  E., south side of entrance of Bielogrudvo Channel.

**Lights.**—The channel above the lightvessel is marked on the northern side by eight fixed red lights and on the southern side by seven fixed white lights.

**Buoys.**—The channel is also marked by red buoys on the north side and by white buoys on the south side.

**Directions.**—From Adzhigiol Point follow the dredged channel, which is marked by spar buoys, as far as the Stanislav Narrows; thence, if bound for the Rvach Entrance, steer through the Rvach Channel, marked by spar buoys by day and by leading lights at night.

If bound for the Zburev Entrance, after passing Stanislav Narrows, steer for the entrance to the buoyed channel. Pilotage is compulsory.

**Kherson** (lat.  $46^{\circ} 38'$  N., long.  $32^{\circ} 37'$  E.).—The town stands on the right bank of the Dniepr, where it is  $\frac{1}{2}$  mile in breadth and 30 to 40 feet deep. It is built in a semicircular form on a slight elevation, sloping down to the river at its junction with the Koshevaya Branch, and had in 1900 a population of 73,200.

**Ice.**—The port may usually be considered to be open from February to December of each year.

**Trade.**—At Kherson there are several sawmills for manufacturing marketable wood from the large quantities of lumber floated down the river from the interior, and extensive wool washeries are in operation on the quarantine island, Kherson being the most important town in Russia for merino wool.

Timber and grain are the principal exports.

**Communication.**—In normal times steamers run daily in spring and summer and three times a week in autumn between Kherson and Nikolaev; also up the Dniepr as far as Alexandrovsk, from which place there is communication by rail with Sevastopol, Moscow, and St. Petersburg. Steamers also run to Odessa.

A railway connects Kherson with Nikolaev, and a line to Djankoi junction (for Sevastopol and Kertch) is under construction.

**Bug River.**—The entrance to the Bug River, which forms the waterway to the important town of Nikolaev, lies between Adzhigiol and Bublikov Points, which are 11 miles east and west from each other. The river is from 1 to 3 miles wide, with a tortuous course, the shores and points being bordered with sand flats, especially on its eastern side, where in some places they extend out beyond the middle of the stream.

The right (western) bank of the river is almost everywhere clay, steep, and high. The left bank, on the contrary, consists of gently undulating hills and of low tongues of sand.

The channel follows generally the right bank of the river, except to the southward of Volosh and Russian Spits, where it is in mid-river, and near Fort Konstantin, 2 miles south of Nikolaev, where it lies near the left bank.

**Depths—Dredged channel.**—The depths in the river are very variable, but a channel with a least depth of 25 feet is maintained as far as the bridge over the Ingul River, on the north side of Nikolaev.

**Caution.**—Dredgers are constantly at work in the river. Vessels passing them must reduce speed in good time in order to avoid causing damage.

**Depth signals.**—Three miles to the northward of Sarikalsk Point on the western side of the river entrance, is the village of Parutino (Ilinskoe), a little southward of which is a round yellow tower surmounting an octagonal building, with a signal mast close to it, from which signals are made to indicate the depth in the channel.

Vessels can communicate with the Parutino signal stations by International Code, and messages will be transmitted by telegraph to their destinations.

**Beacons.**—On the west side of the entrance to Bug River, between Sari Kamishi and Sarikalsk Point, is a black beacon with square topmark, 56 feet in height, which forms a useful mark, the coast here presenting no conspicuous features.

Range beacons are established on the east side of the river entrance. The rear beacon, a black truncated pyramid, 46 feet in height and 130 feet above the sea, stands near the village of Khablova. The front beacon, a white truncated pyramid, 46 feet in height and 116 feet above the sea, stands on Khablova Point. These beacons in range 64° lead through the third reach of Ochakov Channel.

**Buoys.**—The dredged channel from Adzhigiol Lightvessel to Volosh Spit is marked on the starboard side by black spar buoys with upright cones and on the port side by red spar buoys with inverted cones. The dredged channel from Didova Khata to Vavrovka and into the Ingul River is marked on the starboard hand by



black spar buoys surmounted by flags and on the port hand by red spar buoys surmounted by flags. A red buoy, showing a group occulting red light, is moored on the port side of the junction between the third and fourth reaches of the Ochakov Channel.

The shallows extending from the sides of the Bug River are marked by buoys and beacons, red on the port hand (west bank), black on the starboard hand (east bank). Starboard-hand buoys on entering are surmounted by cones, with their points upward, and port-hand buoys by cones with the points downwards. A red spar buoy marks the edge of the shoal off Sarikalsk Point, 1,400 yards from the shore. This bank is steep to and can not be approached by the lead, and this is the case with most of the shallows in this river. On the opposite side there is a black spar buoy about 1 mile to the westward of Khablova Point, and a similar one about  $\frac{3}{4}$  mile to the westward of Semenov Point. A red buoy, with inverted cone topmark, is moored off the end of Volosh Spit; and a black one, with upright cone, on the extreme of the Russian Spit opposite. Farther up, two black conical buoys and two black spar buoys show the edge of the shoals extending off Ozharsk Spit, and a black conical buoy and a black spar buoy the prominent points of the shallows off Krivaya (Crooked) and Balabanovka Spits. A red spar buoy is placed on line of the Siversov range lights at the extremity of the shoal southeast of Kozirka village. Nearly 1 mile to the southward of Fort Konstantin a red spar buoy marks a projecting point of the shallow on which that fort is built; and the east extreme of the dike eastward of the fort is marked by a red pyramidal beacon buoy, with staff and ball, in a depth of 30 feet, which shows a fixed red light. Beyond it a red conical buoy and a red spar buoy show the northern edge of the shoal.

Black buoys mark the edge of the shallows off the low land on the south and west sides of the town of Nikolaev, the most important being a black pyramidal beacon buoy, with staff and ball, showing a fixed red light, moored on the southern edge of the bank extending from Lyeskov Spit, nearly opposite Didova Khata Lighthouse, where the channel is narrowed to about 400 yards.

All the buoys in the Bug River are placed in not less than 18 feet water.

**Lights.**—The lights in the approach to the Bug River have already been described. Those in the river are as follows:

An alternating red and white light, 143 feet above high water, is exhibited from a small wooden yellow structure located 1 mile west of the village of Sari Kamishi, north side of Dnieper Bay.

A buoy with a pyramidal tower, exhibiting a group occulting red light, is moored in 20 feet, 1,500 yards  $143^{\circ}$  from Sari Kamishi

Beacon. It marks the junction of the third and fourth reaches of Ochakov Channel.

An alternating red and white light, 21 feet above high water, is exhibited from an iron hut on piles located at Lower Volosh, near the extremity of the spit.

A fixed red light and a fixed white light, 130 and 133 feet above high water, respectively, are exhibited from a white house located at Upper Volosh on the first high bluff north of the spit.

Two fixed white lights, 36 and 9 feet above high water, respectively, are exhibited from a white iron tower on piles located on the east bank of the river opposite Fort Konstantin.

The river above Fort Konstantin is marked by five lights on the eastern shore and one on the western.

**Range lights.**—A fixed red light, 80 feet above high water, is exhibited from a square iron tower located on Khablova Point, east side of the Bug River.

A fixed white light, 133 feet above high water, is exhibited from a stone tower located 1.3 miles  $64^{\circ}$  from the front light.

These lights in range bearing  $64^{\circ}$  lead through the third reach of the Ochakov Channel entrance of the Bug River.

A fixed white light is exhibited from a white tower located on the south side of Luparev village, east side of the Bug River.

A fixed white light, 195 feet above high water, is exhibited from a white house with a red roof located at Kisliakovka, about 3 miles  $41^{\circ}$  from the light at Luparev village.

These lights in range bearing  $41^{\circ}$  lead through the fourth reach of the Ochakov Channel.

A fixed white light, 55 feet above high water, is exhibited from a white cylindrical iron tower located on the extreme point of Russian Spit.

A fixed white light, 124 feet above high water, is exhibited from a red circular iron tower located on Ozaharsk Spit.

These lights in range bearing  $3^{\circ}$  lead through the channel from Sarikalsk Point to Voloski Spit.

Two fixed red lights, 38 feet above high water, are exhibited from a white quadrangular stone house located on Siversov Spit, east side of the river.

A fixed white light, 187 feet above high water, is exhibited from a white stone house located 2,840 yards  $44^{\circ}$  from the front light.

These lights in range lead clear of the shoals on both banks of the river.

A fixed green light, 54 feet above high water, is exhibited from a red iron pyramidal-shaped tower with a fan-shaped topmark located 580 yards north of Konstantine Light.

A fixed red light, 76 feet above high water, is exhibited from a red iron pyramidal-shaped beacon with a fan-shaped topmark located 117 yards 16° from the front light.

These lights in range lead clear of the wreck in midchannel southward of Fort Konstantine.

**Directions for Bug River—By day.**—From the Adzhigiol lightvessel steer between the spar buoys marking the dredged channel, with the Khablova beacons in range, 64°, until Kisliakovka and Luparev Lighthouses are in range, 41°. Keep on this range until Ozharsk Lighthouse is in range with Svyatotroitza Lighthouse, 3°, which leads up to Volosh Spit. Pass between the buoys marking the shallows off this spit and Russian Spit, and then follow the curve of the west bank at  $\frac{1}{2}$  mile, leaving the black buoys and beacons to starboard. When abreast of Siversov Lighthouse follow the east bank of the river, passing between the red lightbuoy off Fort Konstantin and the lighthouse, thence along the same shore up to the quays at Nikolaev.

**By night.**—From the Adzhigiol lightvessel steer 64° to pass southward of the lightbuoy off Sari Kamishi, which marks the junction between the third and fourth reaches of the Ochakov Channel. From thence steer with Kisliakovka and Luparev Lights in range, 41°, until Ozharsk Light is in range with Svyatotroitza Light, 3°, which will lead through the last reach of the dredged channel and up to abreast of Volosh Spit, when Upper Volosh Light will be seen. Steer for this light on 289° until Lower Voloshki Light opens, bearing 146, when course should be altered to 326°, keeping within its arc of visibility until the northern sector of white light from Upper Volosh Lighthouse comes in view, when keep within the limits of this latter sector, at sufficient distance from the west bank, observing that the eastern limit of this light passes very near the shoals off Ozharsk Spit. Continue this curving course until the Siversov Lights appear, which in range 45° will lead close up to Siversov Spit. The east bank should now be followed, passing between the lightbuoy off Fort Konstantin and the light abreast of it and anchoring southward of the town. Pilotage is compulsory.

**Nikolaev** (lat. 46° 58' N., long. 31° 59' E.).—The town of Nikolaev is situated 28 miles above Adzhigiol Point, on the eastern part of a peninsula formed by the Bug River and its tributary, the Ingul, which latter, often following a shallow and sinuous course, flows into the Bug along the northern shore of the town. The western part of the peninsula is formed by sandhills, covered with vegetation, and on its northwestern shore are several country houses surrounded by trees.

The southern and western sides of the peninsula are bordered by a shallow bank, which, southward and westward of Lyeskov Spit, extends 1,400 yards from the shore.

**Commercial port.**—The commercial port of Nikolaev, situated on the southern side of the town, comprises a granite quay, 3,850 feet in length, with extensive wharf space and railway communication, alongside which is a depth of  $21\frac{1}{2}$  feet. There are two grain elevators, at which four vessels can be loaded simultaneously.

**Cabotage Harbor**, situated westward of the commercial quay, is formed by a mole 900 yards in length extending from the shore in a southeasterly and easterly direction. It has been dredged to a depth of about 17 feet, and is used by coasters, by vessels plying regularly to the port, and by vessels wintering.

**Petroleum Pier**, about 600 yards to the westward of Cabotage Harbor, is 900 feet in length and is used for shipping petroleum. About 800 yards to the northwestward of the pier are two white cylindrical reservoirs with a white tower between them.

**Naval port.**—The naval yard and the arsenal are situated on the northern side of the town on the banks of the Ingul River. The naval yard is separated from the arsenal by a bridge the ends of which are carried on piles and the center on boats. This bridge can be opened for the passage of vessels.

The channel leading from the Bug into the Ingul and up to the naval port is dredged to a depth of 25 feet.

**Bridge of boats.**—A bridge of boats,  $\frac{1}{2}$  mile long, connects Spasskoye with the village of Varvarovka on the western bank of the river. It is opened for the passage of vessels at 5 p. m. on Mondays and Fridays (market days at Nikolaev), and at 9 a. m. and 5 p. m. on other days of the week.

At Spasskoye, just below the bridge of boats are two piers, the northern belonging to the Russian Steam Navigation Co., and the other to the arsenal, which latter is used by the boats of naval vessels.

**Swinging buoys.**—A mooring buoy is situated in the anchorage on the central alignment  $1\frac{3}{8}$  miles  $167^\circ$  from the front beacon. Around this buoy are eight others, which permits of vessels being swung on eight equidistant points.

**Measured mile.**—There are two pairs of beacons on the shore westward of Didoya Khata, marking the ends of a measured mile.

N. W.

The course to be steered is  $52^\circ$  ; the depth on the course is only 25 feet.

S. E.

**Beacons for adjusting compasses.**—About  $2\frac{1}{2}$  miles to the northward of Powder Magazine Point, on the left bank of the river,

is a white wooden pyramidal beacon, with staff and cone, and 800 yards northward of it are five white stone beacons side by side. The alignment of the front beacon with one of the rear beacons enables vessels in the anchorage northward of the entrance to the Ingul to ascertain the deviation of their compasses.

The true bearings of these alignments are, respectively, N.  $12^{\circ} 3' W.$ , N.  $12^{\circ} 48' W.$ , N.  $13^{\circ} 33' W.$ , N.  $14^{\circ} 18' W.$ , and N.  $15^{\circ} 2' W.$

**Ice breakers** are stationed at Nikolaev for use in the Bug River and Kherson Bay.

**Pilots.**—There is a pilot station on the Commercial Quay.

**The town**, with a population of 92,060 in 1897, covers a large extent of ground. It is traversed by wide streets, which cross one another at right angles. The two principal, Khersonskaya Street and Sadovaya Street, divide the town into four quarters, of which the western quarters are the best built.

**Communication.**—In normal times steamers in the summer ran daily to Odessa (8 hours), and to Constantinople frequently. In the autumn they ran three times a week. Steamers also ran daily, Saturdays excepted, to Kherson and Voznasensk. There is constant steamer communication between Nikolaev and Ochakov. Rail to Kharkov, Moscow, and Petrograd by the Kharkov-Nikolaev line via Snamenka; also to Kherson. Communication by telegraph with all parts.

**Coal and supplies.**—In normal times about 6,000 tons of Donetz coal was usually in stock. Vessels coal alongside the quay. Previous notice must be given if a large quantity is required.

Supplies of all kinds could be obtained at reasonable prices; vegetables scarce. Water is brought to vessels alongside the quay in water carts.

**Storm signals** are made from a flagstaff on the Commercial Quay.

**Time ball.**—From the observatory situated westward of the town on the highest point of the peninsula, 229 feet above the river, and in long.  $31^{\circ} 58' 28'' E.$  of Greenwich, a black ball is dropped at noon, Nikolaev mean time, which corresponds to 21 h. 52 m. 6.1s. Greenwich mean time. A gun is fired at the same time.

The ball is hoisted close up at five minutes before signal. If signal fails, the ball, after an interval of one minute, is lowered very slowly.

**Signal station.**—A round stone tower with octagonal base, painted yellow, 92 feet in height, surmounted by a signal mast, stands close eastward of the observatory.

**Repairs.**—The workshops in the naval yard have all the necessary appliances for the construction and repair of large vessels. The Chantiers Navals can also effect large repairs.

**Patent slip.**—There is a patent slip in the naval yard which will take up a vessel of 1,200 tons drawing  $5\frac{1}{2}$  feet forward and  $21\frac{1}{2}$  feet aft. The cradle is 180 feet in length.

**Hospitals.**—There is a naval and a town hospital affording excellent accommodations for seamen of all nationalities.

**Quarantine.**—The health and customs officials board vessels at Ochakov.

The customs officials seal the hatches. Care should be taken to see that everything is declared and the seals are kept intact as there is a fine for each seal broken.

**Health.**—There are no climatic diseases, but during the hot season river fish and raw fruits should be avoided as liable to produce diarrhea and cholera.

**Kinburn Bay (Egorlitz Gulf).**—The coast from Kinburn Point continues low and sandy to the southeast 11 miles. It then bends in to the eastward, forming the spacious Bay of Kinburn, which affords plenty of room for small vessels, in depths varying from 12 to 20 feet, over a bottom of mud and sand and sheltered from northwesterly and northerly winds.

Southeastward of the northern entrance point of the bay are two low islands, known as Kruglie and Dolghi. The former is small in extent; the latter is 4 miles long and  $\frac{1}{2}$  mile wide.

The entrance into the bay is about  $2\frac{1}{2}$  miles in breadth, between Dolghi Island and its southern shore, but the channel, with depths of 12 to 15 feet, is only  $1\frac{1}{2}$  miles wide.

The shores of the bay are generally low, the northern consisting of sand hills, some of which are wooded. The northern shore is inhabited, the village of Pokrovka covering a considerable extent of ground among the sandhills. Fresh water can be obtained at Pokrovka or from wells at the head of the bay. The water obtained from the wells on the southern shore is brackish.

Weed is very abundant and forms a great hindrance to steam navigation owing to its fouling the propellers. Boats can not in most places approach the shores of the bay owing to the very shallow water.

**Anchorage.**—The usual anchorage is about 2 miles eastward of Dolghi Island. Northwesterly winds force the water into the gulf, causing a current which sets round the bay and keeps vessels tide-ride.

**Tendra Peninsula.**—The long sandy plain which terminates to the westward in the Kinburn and Egorlitz Peninsulas is bordered to the southward by Tendra Peninsula, a long strip of sand, about 35 miles in length and at its northern extremity about 1 mile in breadth, but as it trends to the eastward it gradually narrows to less than a quarter of a mile. Two narrow channels or breaks, named Vassal-

skaya and Kazen, of about 200 yards in breadth, separate its eastern end from the mainland.

The lead should be kept constantly going in approaching the peninsula.

**Tendra Peninsula Light**, alternating flashing white and red, 45 feet above high water, visible 6 miles, is exhibited from a yellow wooden hut on piles located about 200 yards  $197^{\circ}$  from the extremity of the peninsula.

There is a conspicuous clump of trees on the coast about  $1\frac{1}{2}$  miles to the northward of the lighthouse.

**Signal station.**—The lighthouse is connected by telephone with the village of Chernamorskaya Kolod. Telegrams will be received from vessels by International Code and forwarded to their destinations.

**Caution.**—Wrecks, more or less visible, frequently exist in the southern approach to Tendra Lighthouse, which, not being always buoyed, form a danger to navigation.

**Light.**—A revolving white light, 96 feet above high water, is exhibited from a white circular stone tower with two black horizontal bands located 2.8 miles  $194^{\circ}$  from the north point of the peninsula.

**Fogsignal.**—The fogsignal is a bell.

**Beacons.**—The land of the peninsula being very low, and not visible sometimes even in fine weather at a distance of more than 3 or 4 miles, three beacons have been erected on it, each about 60 feet in height. The first stands  $4\frac{1}{2}$  miles southeastward from the lighthouse, and consists of a mast, with supports, with spherical topmark. The second stands about 4 miles southeast from the first and has a head formed thus, (M) and the third, about 17 miles to the eastward of the second, between Vassalskaya and Kazen Ferries, has a square framework topmark.

**Tendra Bay.**—There is good anchorage in Tendra Bay to the eastward of the lighthouse, in 6 to 7 fathoms,  $2\frac{1}{2}$  miles from the shore, well sheltered from the south and west, as far round as  $327^{\circ}$ , but the bay open to the north-northwest. The space formed to the eastward between the eastern part of the peninsula and the mainland, known as Tendra Gulf, is very shallow, having only a depth of from 10 to  $1\frac{1}{2}$  feet in it.

**Buoys.**—During the summer the 5-fathom line on the north-eastern side of the bay is marked by three red spar buoys with inverted cone topmarks; on the southeastern and western sides by eight black spar buoys with upright cone topmarks.

**Anchorage.**—Should a vessel when bound to Odessa meet with strong northerly winds, she may anchor to the southward of the peninsula in any convenient depth, as the shore is clean. There are

from 27 to 32 feet  $1\frac{1}{2}$  to  $3\frac{1}{2}$  miles from it, and from 7 to 9 fathoms  $1\frac{1}{2}$  to 2 miles to the westward of the lighthouse, over a bottom of sand and shells.

**Caution.**—The lowness of the Tendra Peninsula renders it very dangerous, especially as the current, which usually sets to the eastward, is very variable in strength. This current is strongest with westerly winds, and vessels bound from the southward to Odessa, after ascertaining their position off Fido Nisi (Serpent Island), often sight Tendra Lighthouse when expecting to make Odessa. In foggy weather, therefore, when in this vicinity, the lead should be kept constantly going, and great attention paid to the soundings.

**Dzharuilgach Spit and Bay.**—The coast to the eastward of Tendra Peninsula continues low with some high buildings on it, and runs in an easterly direction for 14 miles. From thence a long strip of narrow land, called the Dzharuilgach Spit, extends in the same direction for 22 miles to Dzharuilgach Point, forming with the mainland a deep bay, the outer part of which affords excellent anchorage for vessels of a moderate draft seeking shelter from west or southwest winds. The western end of the spit, near which there is a narrow channel and a ferry, about  $1\frac{1}{2}$  miles to the southward of Sofievka village, is not more than 200 yards across, but 10 miles farther eastward it widens and for the remainder of its extent, which is known as Dzharuilgach Island, it is from 1 to  $2\frac{1}{2}$  miles wide.

A 3-fathom patch is situated about  $2\frac{1}{4}$  miles to the southward of Dzharuilgach Point, the east extreme of Dzharuilgach Island; and a shoal, with only 6 feet water, extends for more than 1 mile to the northeastward of this point, which should therefore be rounded with great caution.

**Perekop Gulf Light**, fixed white with red sectors, 80 feet above high water, is exhibited from a white iron tower located on Dzharuilgach Point.

**Fogsignal.**—The fogsignal is a bell. (See Light List.)

**Beacon.**—A beacon, 65 feet high, consisting of a mast with supports, surmounted by a barrel, stands on Dzharuilgach Spit, about  $11\frac{1}{2}$  miles to the westward of Dzharuilgach Point.

**Buoys.**—The shoal around Dzharuilgach Point is marked by three red spar buoys, with inverted-cone topmarks and by a red conical buoy. The 3-fathom shoal  $2\frac{1}{4}$  miles southward of the point is marked by a black spar buoy with upright cone topmark, moored  $\frac{1}{2}$  mile northeastward of it. Within Dzharuilgach Bay the edge of the shore bank is marked in 4 fathoms by 2 black spar buoys, with upright cones on the northern side and by 2 red spar buoys with inverted cones on the southern side.

**Anchorage.**—A vessel in rounding Dzharuilgach Point must be careful to avoid the shoal which extends from it, a good mile, to the



northeastward, and is the beginning of a flat, carrying a depth of 7 to 11½ feet, which encircles the whole shores of the bay. The best anchorage is in the middle of the entrance, in 5 fathoms, over a muddy bottom, about 3 miles to the northward of the point.

Weed is abundant in the bay during summer and autumn and forms a hindrance to navigation.

**Skadovsk.**—The large village of Skadovsk is situated on the north shore of Dzharuulgach Bay, about 9 miles to the northwestward of the lighthouse. All vessels proceeding to any of the anchorages in Karkinit Bay are obliged to call at Skadovsk for pratique, customs examination, and to receive pilots. Arrangements can, however, be made by telegraph for a vessel to be met by the necessary officers off the lighthouse. Pilotage is not compulsory, though advisable, for the port of Skadovsk itself.

A church, which forms a good landmark, is situated in the village.

**Basin.**—Vessels usually load in the basin, which is 280 feet long and 210 feet wide and has a depth of 25 feet. It is approached by a channel 1,120 feet long. The channel leading to the basin has been dredged to a depth of 25 feet.

**Anchorage.**—Good anchorage may be obtained southward of the church, in 19 feet, 1 mile offshore, or in 25 feet, 2 miles offshore, cargo being brought off in barges.

**Buoy.**—A white spar buoy is moored in 11 feet of water to mark the mail steamers' anchorage.

**Range lights.**—A fixed red light, 29 feet above high water, is exhibited from a white mast with a triangle located at Skadovsk, 47 yards from the water's edge.

A fixed white light, 32 feet above high water, is exhibited from a white mast with a diamond located 245 yards 12° from the front light.

These lights in range, bearing 12°, lead through the channel to the port.

**Communication.**—In normal times steamers called here from Odessa weekly. It is proposed to connect the port with the Sevastopol Railway.

**Gulf of Perekop.**—This gulf, between Dzharuulgach Spit and the northwest shores of the Crimea, is about 40 miles wide at its entrance, with depths of 17 to 6 fathoms, and forms the approach to Dzharuulgach and Karkinit Bays.

**Water level.**—Strong winds offshore lower the level of the water in the gulf and adjacent bays 2 or 3 feet.

**Karkinit Bay,** situated in the eastern part of the Gulf of Perekop, is bordered, especially on its northern and eastern shores, by extensive shoal flats. It terminates to the northeastward in Perekop

Bay, at the head of which, on the isthmus dividing it from the Sivash or Putrid Sea, is the village of Perekop.

**Bakal Spit—Beacon.**—The southern shore of Karkinit Bay trends in a general west-southwesterly direction as far as Bakal coast guard station, where it turns to the northward, forming Bakal Spit, the extremity of which, known as Kuiln Murun or Saribula Point, situated 13 miles  $159^{\circ}$  from Dzharuulgach Lighthouse, is marked by a black pyramidal beacon, 62 feet high, surmounted by a ball.

**Bank.**—A narrow bank, with  $1\frac{1}{4}$  to 3 fathoms, extending 10 miles in a northerly direction from Kuiln Murun, lies in the fairway of the approach to Karkinit Bay. The northern extremity is marked by a black conical buoy in  $2\frac{1}{4}$  feet of water. This buoy must not be relied on.

The channel into the bay lies northward of this bank.

**Landmarks.**—The shores of Karkinit Bay are low and flat, and in summer the recognition of the coast is rendered very difficult by mirage.

The best landmarks are Dzharuulgach Lighthouse; Khorli Point, the extremity of which is steep and yellowish in color; Bakal Spit Beacon; and the coastguard station at Bakal, which stands on a slight elevation and consists of two well-built stone houses.

**Khorli.**—This port is situated on the northern shore of the bay, at the southern extremity of the peninsula of the same name. The principal export is wheat.

There is a wooden quay alongside which vessels load, and 50 yards eastward of it is a wooden pier.

Khorli is connected with Perekop by telephone. There are several artesian wells and fresh water is plentiful.

**Light.**—A fixed red light, 20 feet above high water, is exhibited from a beacon surmounted by a ball located on Kalanchak Island Spit.

**Dredged channels.**—A channel, 105 feet wide, with a depth of 18 feet, has been dredged from Karkinit Bay, in an easterly direction, into Khorli Anchorage. The channel is about  $2\frac{1}{4}$  miles in length, and its western end is situated  $5\frac{1}{4}$  miles  $80^{\circ}$  from Dzharuulgach Lighthouse.

It is marked on its northern side by red spar buoys and on its southern side by black spar buoys, those at the entrances having topmarks, inverted cones on the northern side, and upright cones on the southern side.

A black buoy is moored in the western approach to the channel in a depth of 25 feet. Vessels must pass northward of it.

From the anchorage a channel, 18 feet deep, leads up to the quay. It is marked on the western side by red spar buoys and on the eastern side by black spar buoys.

An area has also been dredged off the quay, extending 500 feet seaward and for about the same distance parallel to the shore. The eastern part has a depth of 20 feet and the western part of 16 feet.

Half a mile eastward of the pier is a small basin having a depth of 9 feet with a channel of the same depth leading to it.

**Pratique.**—A health officer is stationed here.

**Range lights.**—A fixed red light, 44 feet above high water, is exhibited from a red mast surmounted by a checkered triangle located at Khorli.

A fixed white light, 66 feet above high water, is exhibited from a yellow mast surmounted by a checkered disk located 273 yards  $13^{\circ}$  from the front light.

These lights in range, bearing  $13^{\circ}$ , lead through the channel from the anchorage to Khorli.

**Churyum.**—About 4 miles southeastward of Khorli is Churyum Pier with a depth of 9 feet alongside. The village of Alexsyevka or Churyum is about 2 miles inland from the pier.

**Bakal** (lat.  $45^{\circ} 44'$  N., long.  $33^{\circ} 13\frac{1}{2}'$  E.), situated in the southwestern corner of the bay, has two piers which are used for embarking salt obtained from the salt pans in Bakal Lake.

Anchorage, in 4 to 5 fathoms, shelly bottom, well sheltered from westerly winds, can be obtained eastward of Bakal Spit.

**The Crimea.**—The Crimean Peninsula extends about 178 miles from east to west and 107 miles from north to south. Its figure is quadrilateral and the angles are directed to the cardinal points. From the eastern point, however, a peninsula stretches out between the Sea of Azov and the Black Sea, terminating on the shores of Kertch Strait. On three sides the Crimea is inclosed by the Black Sea; on the northeast it is washed by the Sea of Azov. Its area may be about 8,600 square miles, and the neck of land at its northern extremity, by which it is connected with the continent, is about 20 miles long and 5 miles wide at Perekop. Its northeastern division is a steppe and has neither tree nor hill, but its southern part presents a far different appearance, the mountains rising to a considerable height and encircling valleys of great beauty and fertility.

**Northwest coast.**—The northwestern part of the Crimea is about 63 miles long from Kartkazak in Karkinit Bay to Karamrun Point, and is formed of elevated plains, which may be seen from a good distance. Its shores westward of Bakal Spit are bold and steep.

**Yaruilgach Bay.**—About 20 miles to the southwestward of Kuiln Murun, the extremity of Bakal Spit, is Cape Kara Burnu, the

northern point of the large Bay of Yaruilgach, which is bordered by a sandy beach and is prolonged by two large salt lakes.

The entrance is about  $1\frac{1}{2}$  miles in width, both points being fringed by rocky shoals. Within the entrance the shores of the bay are clean, and the depths from 5 to 6 fathoms over a sandy bottom.

The northern part of the bay is sheltered from seaward by Cape Kara Burnu and the shoals off it. The bay is open to westerly winds.

The village of Yaruilgach stands on a height eastward of Cape Kara Burnu. Its mills are visible from seaward. No supplies are obtainable.

**Yaruilgach Bay Light**, fixed red, 28 feet above high water, is located on the east shore of the bay.

**Akmechet Harbor** (lat.  $45^{\circ} 31' N.$ , long.  $32^{\circ} 42' E.$ ).—Akmechet (or White Mosque) Harbor lies 16 miles southwestward of Cape Kara Burnu, and is much frequented by vessels running between Odessa and the Crimea. It may be recognized by the high tower of the church, which has a spire and is elevated 200 feet above the sea. The remains of a tower stand upon the western point of the entrance, which is nearly  $\frac{3}{4}$  mile wide, but is narrowed to 600 yards by rocks bordering the points, shoal water extending 400 yards from the west point and 200 yards from the east. The harbor is nearly  $\frac{3}{4}$  mile long and has a village on its southern shore.

**Shoal**.—A shoal, with a depth of 12 feet over it, is situated nearly 400 yards northeastward from the inner western point. The range of leading beacons passes the shoal only about 20 yards.

**Beacons**.—Two mast beacons, 55 feet in height, are erected in the southern part of Akmechet Bay for use as clearing marks. The front beacon, surmounted by a triangle, is situated on the shore to the northward of the village. The rear beacon, about 1,000 yards to the southward of the former, is surmounted by a ball.

The beacons in range, bearing  $178^{\circ}$ , clear the shoals in the western part of the bay in 15 feet water. The northern beacon, in range with the Church of St. Zakhariah, which stands to the southward of the village, bearing  $199^{\circ}$ , leads close to but clear of the shoal water off the eastern entrance point, in 25 feet water. The northern beacon, bearing  $192^{\circ}$ , leads up the center of the bay.

**Anchorage**.—The best anchorage is about 600 yards,  $21^{\circ}$ , from the village, in about  $4\frac{1}{2}$  fathoms, on a sandy bottom, midway between its two inner points, which are also bordered by rocks. Between the village and the inner point, on the western shore, the coast recedes  $\frac{1}{2}$  mile to the southwest, forming a cove, which is used by small vessels to load salt, and in which they may anchor, in  $1\frac{1}{2}$  to 2 fathoms, sandy bottom, well sheltered from northwesterly and northerly winds, to which they would be exposed in the harbor.

**Mole.**—There is a depth of 8 feet alongside the stone mole. Eastward of it is a wooden pier, 490 feet long, with a depth of 3 feet at its outer end. There is a telegraph station in the village.

**Kamarun Point**, the western extremity of the Crimea, is situated 11 miles southwestward from Akmechet Harbor. It is steep and of a reddish color. Northeastward of it is a remarkable point which descends to the sea in four declivities.

**Karadzha Bay**, situated between Kamarun Point and Cape Tarkan, affords good anchorage in easterly winds, in depths of from 5 to 10 fathoms, but is open to the westward. Protection is given to this anchorage from northerly winds by Kamarun Point, and from southerly winds by a rocky bank which extends 1 mile to the westward of Cape Tarkan. A large house, with tower on the north shore of the bay, affords an excellent anchorage mark.

The village of Karadzha is situated at the head of the bay, and westward of the house with tower is a small wooden pier.

An iron mooring buoy is placed 600 yards southward of the pier.

**Life-saving station.**—There is a life-saving station with rocket apparatus on the beach southward of the village.

**Karadzha Bay Light**, fixed white, 70 feet above high water, is located 2.3 miles  $15^{\circ}$  from Cape Tarkhan Light.

**Cape Tarkhan** (lat.  $45^{\circ} 21' N.$ , long.  $32^{\circ} 30' E.$ ),  $2\frac{1}{2}$  miles,  $167^{\circ}$ , from the southwest extreme of Kamarun Point, is low and only visible from a short distance.

**Bank.**—The rocky bank mentioned above, extending from Cape Tarkan, has near its outer end a depth of only 12 feet and many sunken rocks. It should not be approached as it is dangerous.

**Cape Tarkhan Light**, group flashing white, 117 feet above high water, is exhibited from a white circular stone tower located on the southwestern extremity of the cape, 35 yards from the sea.

**Fogsignal.**—The fogsignal is a siren. A bell is sounded in case the siren does not function.

**Signal station.**—A telephone station is annexed to the lighthouse. Vessels can communicate with the station by International Code and telegrams will be forwarded to their destination to be paid for on delivery. Replies to telegrams will not be signaled to vessels.

**Storm signals** are shown near the lighthouse.

**Winds.**—Near Cape Tarkan are often experienced changes of wind, squalls, or sudden calms, when the current makes the sea short and broken. Off the cape the wind generally hauls around to the northeast during the night.

**Currents.**—In passing Cape Tarkhan, or the Gulf of Perekop, a strong current will be felt setting to the eastward with westerly winds and to the westward with easterly winds, which must be carefully

watched in order to profit by its variations. A change takes place in the color of the sea off Cape Tarkhan, from a bright blue to a dirty and dark green, and the tint gradually deepens as Odessa is approached.

**Uret Point.**—From Cape Tarkhan the coast trends  $101^{\circ}$  for 7 miles to Uret Point, where the shore forms an angle of white bold rocks. On the summit of the point is the village of Oirat with a minaret and two mills. Uret Point has shoal water off it, and the depth of 5 fathoms will be found nearly  $\frac{1}{2}$  mile to the southward. There is anchorage to the eastward of the point in about  $8\frac{1}{2}$  fathoms, over sand and mud, well sheltered from all northerly winds.

The coast from Uret Point bends in to the northeastward and eastward for 9 miles, when the cliffs disappear and a sandy beach commences which trends to the southeast for 22 miles to Eupatoria Point. Westward of the village of Terekli, situated 11 miles eastward of Uret Point, is the large salt lake of Donuzlav, separated from the sea by a narrow tongue of sand 5 miles in length.

Between this lake and Eupatoria Point are several small salt lakes, off which are some small piers for embarking salt. A depth of 10 fathoms will be found at  $1\frac{1}{2}$  miles from the shore along this coast.

**Eupatoria Point** is low and sandy, and should be approached carefully, as the soundings shoal quickly from 7 fathoms to 16 or 18 feet. There is a depth of 4 to 5 fathoms nearly 1 mile southward of the point. A red spar buoy, with inverted cone topmark, is moored in 30 feet water on the edge of the shoal extending from Eupatoria Point, with the lighthouse bearing  $16^{\circ}$ , 1 mile.

**Eupatoria Point Light**, alternating fixed and flashing red and white, 53 feet above high water, is exhibited from a white circular iron tower with a red lantern located on the point.

**Fogsignal.**—The fogsignal is made by gunfire.

**Kalamita Bay.**—From Eupatoria Point the coast again bends eastward 7 miles. It then trends to the southward for 24 miles, where it makes a short turn to the westward to Cape Lukul, thus forming the Bay of Kalamita. The shore of the bay is clean, and a depth of 5 fathoms will be found  $\frac{3}{4}$  mile from the coast, except near the foul ground bordering Eupatoria Point, and off Cape Lukul.

**Eupatoria (Koslov)** stands on low, flat, and sandy country in the northern bight of the bay. A little to the westward of the town the low point of the lazaretto (Quarantine Point) projects to the southeastward, and is bordered by a sand bank which extends 500 yards from the shore, where 3 fathoms will be found.

The Armenian church, a large building with a cupola; a mosque, near the shore, with a large Byzantine cupolo; and the orthodox church, with a green cupola, to the eastward of the mosque, are the principal objects seen when approaching the town.

There are several windmills eastward of the town on the narrow neck of land separating the northern end of the great salt lake of Eupatoria or Sivash from the sea. To the southeastward of the town may also be seen the summits of several mountains on the southern coast of the Crimea, the most remarkable being Chatuir Dag, 4,970 feet high.

The town is fronted by a promenade, off which is a wooden pier having a depth of 7 feet at its outer end. The population in 1897 was 40,300.

**Communication.**—In normal times the steamers of the Rusisan Steam Navigation Co. called regularly twice a week on their way to and from Odessa and other Black Sea ports, except when hindered by bad weather.

There is telegraphic communication, and a railway is projected.

**Eupatoria Light**, alternating white and green, 30 feet above high water, is exhibited from a white iron house on piles located on the extremity of Quarantine Point, south-southwest of the city harbor landing.

**Fogsignal.**—The fogsignal is a bell.

**Anchorage.**—Vessels anchor to east-southeastward of Quarantine Point and to the southward of the mills situated to eastward of the town, where there is a depth of about  $5\frac{1}{2}$  fathoms, over a sandy bottom.

Small vessels anchor nearer the shore, in 16 to 18 feet of water, between the town pier and Quarantine Point, the spit off the latter affording some protection from the sea which rolls in with a southwesterly wind. Easterly winds cause a choppy sea in this anchorage which hinders loading.

There are two mooring buoys in the bay, one of which belongs to the Russian Steam Navigation Co.

This roadstead is dangerous during south, southeasterly, and southwesterly winds, although the southeasterly blow from the shore. Harbor works are proposed.

**Supplies.**—There is no coal kept in stock. Meat and vegetables could, in normal times, be obtained.

**Lifeboat.**—There is a lifeboat and rocket station near the pier.

**Pratique.**—There is a health office at Eupatoria.

**The coast.**—From Eupatoria the shore of Kalamita Bay takes a southeasterly and southerly direction for 25 miles to the Alma River. The shore is low and sandy for about 13 miles, and is bordered by salt lakes, off which are several piers for loading salt. Thence are some low red cliffs and farther southward a guardhouse.

From this the coast continues low, with red cliffs as far south as the Alma, whence it becomes higher with steep perpendicular cliffs and table-land.

The mouth of the Bulganak River, 5 miles northward of Cape Lukul, is marked by a guardhouse on the north side of a deep gully in the cliffs.

The shores of the bay, as mentioned above, are clear with regular soundings, excepting off Eupatoria Point and in the vicinity of Cape Lukul.

**Alma River.**—The Alma River, 4 miles southward of Bulganak River and  $1\frac{1}{2}$  miles eastward of Cape Lukul, has regular soundings off it in a northwest direction, with a bottom of mud under a loose surface of gravel and shells.

**Cape Lukul** (lat.  $44^{\circ} 50\frac{1}{2}'$  N., long.  $33^{\circ} 33'$  E.), the western point of the bay, into which the Alma River empties, forms a remarkable projection, being nearly perpendicular, of little elevation, and of a reddish tint. A flat extends 1 mile offshore northward of the cape, and rocks, nearly dry, lie  $\frac{1}{2}$  mile westward. This cape should not be rounded within 1 mile.

**Beacon.**—A daymark, 50 feet high and 125 feet above the sea, has been erected on Cape Lukul. It consists of a mast, painted black, and with five horizontal laths near the top.

**Lukul Rock**,  $\frac{1}{2}$  mile northwestward of Cape Lukul, is an oval-shaped rocky patch of  $2\frac{3}{4}$  fathoms, nearly 400 yards long.

**Coast.**—From Cape Lukul to the Kacha River the coast is one steep perpendicular reddish cliff with a table top, and about  $\frac{3}{4}$  mile offshore the soundings are very irregular, over a rocky bottom.

**Peter the Great Rocks.**—About 3 miles south-southwest from Cape Lukul is Lukul Bluff, off which are Peter the Great Rocks, with a depth of less than 6 feet over them. They lie in a north and south direction, the northern rock being about 700 yards from the bluff, whilst seaward of them there is only a depth of 5 fathoms, about 1,600 yards from the shore.

**Terrible Rock**, with 2 fathoms, 600 yards from the shore, is nearly 3 miles southward of Peter the Great Rocks and about  $1\frac{1}{2}$  miles north of the Kacha River.

**Kacha Anchorage.**—There is good holding ground off the Kacha River in 12 fathoms, mud, with the mouth of the river bearing  $94^{\circ}$ , 1 mile; and Cape Lukul just shut in by Lukul Bluff, about  $45^{\circ}$ . Between this position and the river the soundings shoal gradually to the shore, and there is  $4\frac{1}{2}$  fathoms 400 yards from the beach. The mouth of the river is not easily seen but is near the center of the beach.

**The coast** between the Kacha and Belbek Rivers, about 4 miles, presents much the same appearance as to the northward, except that the cliffs are more sloping. Off the Belbek the approach to the beach is more regular and less rocky. The beach extends about  $\frac{1}{2}$  mile southward of the river, beyond which the coast again rises to steep



cliffs. A large church is conspicuous in the valley through which the Belbek runs, and mountains rise in triple rows to the eastward, the table-lands of their summits, with their white edges, giving them the appearance of fortifications, the Chatuir Dag, or Tent Mountain, towering above all to the height of 4,970 feet above the level of the sea.

**Measured distance.**—Five pairs of measured-distance beacons have been erected, the northernmost on Cape Lukul, the others at distances apart of 5.998, 0.996, 1.03, and 4.02 miles, respectively, to the southward, marking a continuous distance of 12.044 miles. The course on the run is  $1^{\circ}$  or  $181^{\circ}$ , the depth of water varying from 16 to 32 fathoms. The front beacons are surmounted by triangles, point downwards, and the rear beacons by triangles, point upwards, all the beacons being 47 feet high and painted white.

The direction for running over the measured distance is given by the old church of St. Vladimir, on the south side of Sevastopol Harbor, in range with two beacons, bearing  $181^{\circ}$ . The front beacon is painted white, and is situated  $1\frac{3}{10}$  miles southward of the church; the rear beacon, which is painted red, is 1 mile southward of the front beacon.

**Cape Konstantin** (lat.  $44^{\circ} 38' N.$ , long.  $33^{\circ} 31' E.$ ), nearly  $2\frac{1}{2}$  miles south of Belbek River, is the northern entrance point of Sevastopol Harbor. Its western extremity is known as North Point, and on its southern extreme is Fort Konstantin.

**Shoal.**—The cape is fronted by a rocky shoal, extending  $\frac{1}{2}$  mile  $259^{\circ}$  from North Point, on which there is a patch with only 3 feet water 400 yards from the shore, while a depth of 5 fathoms is found 1,000 yards from the cape.

A vessel must give the southern point of Fort Konstantin a berth of 200 yards, at which distance there is a depth of 5 fathoms.

**Buoys.**—A red whistlebuoy, in 7 fathoms, and a red spar buoy, with inverted cone topmark, are moored off the western edge of the shoal. The southern side is marked by red spar buoys, with inverted cone topmarks. The whistlebuoy must not be relied on.

**Range mark.**—A white watch house, with red tiled roof, situated near the summit of Mount Rudolph, on the southern side of the harbor, kept in range with the cemetery chapel, bearing  $163^{\circ}$ , leads clear of the reef extending from Cape Konstantin.

**Sevastopol Harbor**, about 4 miles long east and west and  $\frac{3}{4}$  mile wide, has for its western extremity Cape Konstantin on the north and Alexander Point on the south. It has a depth of 6 to 10 fathoms in mid-channel with muddy bottom to within  $\frac{3}{4}$  mile of its head, where it becomes more contracted and shallow. The holding ground is good. It is said to be the best harbor in the Black Sea.

Approaching from the east, south, or westward, a landfall should be made on Cape Khersonese Light, taking care, however, not to approach too close, as shoal water the western extremity of which is marked by buoys, extends 500 yards from the western extremity of the cape. From the extremity of the cape a northeasterly course may be taken for the harbor entrance, but care should be observed not to get too close to shore, as it is fronted by shoal water.

**Light.**—An alternating red and green light, 58 feet above high water, is exhibited from a white stone tower located 100 yards 276° from the old church at Vladimir.

**Entrance.**—The entrance between Cape Konstantin and Alexander Point is about 1,100 yards wide and has depths of 7 to 9 fathoms to within 200 yards of either shore.

**Guard ship.**—A guard ship is anchored in the harbor entrance, off Fort Konstantin in summer and off Artillery Bay in the winter.

**Submarine cables—Buoys.**—The position of the submarine telegraph cables which cross the harbor between Fort Konstantin and Alexander Point is marked on each side of the fairway by two black and white buoys, each surmounted by a red triangle; also on Alexander Point by two red posts with disk topmarks, from which red lights are exhibited. A submarine cable is also laid between Nachivnova Battery site and No. 8 battery site. The shore ends of this cable are indicated by white boards 32 feet high, marked "Телеграфъ," placed on the sites of the above batteries, that on No. 8 battery being further distinguished by being surmounted by a triangle, base upward. In order to indicate the line of the cable, a wooden pillar, 21 feet high, and surmounted by a triangle, base downward, has been erected 50 yards in rear of the board at No. 8 battery.

A line of brown buoys is laid across the harbor entrance from Fort Konstantin to Alexander Point, leaving a passage 60 yards wide. A red buoy, moored 30 yards northward of the range of the Inkerman Lights, marks the northern side of the passage and a black buoy the southern side.

**Life-saving station.**—The guard ship is equipped with a lifeboat. There is a refuge house in Artillery Bay.

**Anchorage and wharves.**—The bay eastward of the town, known as South Bay, is used by naval vessels, and to a very limited extent by merchant vessels also. Immediately southward of Nicholas Point is Ekaterininski or Grafski Quay, having a stone staircase terminated by a colonnade. The quay is used as a landing place for boats.

Southward of Ekaterininski Quay is a wharf on piles, and beyond this is the new dockyard, where there are torpedo-boat slips and storehouses.

Southward of the new dockyard is the Customhouse Quay with the customhouse standing on the hill above it. Farther southward are piers.

At the head of the harbor are quays and storehouses for wheat, under the management of the municipality, where trading vessels berth.

The eastern side of the inner harbor is occupied by Government vessels and by a floating dock. The naval barracks stand on high ground on this side of the harbor, and on the low point northward of them is situated the Admiralty, and Lazarev Dockyard. Southward of Paul Point is Dockyard or Korabelnaia Creek, leading to the dry docks and to the suburb of Korabelnaia.

There are numerous mooring buoys in the harbor.

**Submarine cable.**—A submarine telegraph cable crosses the harbor between the Customhouse Quay and the dockyard. Its direction is marked by the word "Telegraph" painted on the Customhouse Quay, and by a telegraph symbol on the front of a shed on the opposite shore.

**Prohibited anchorage.**—Ships are forbidden to anchor in the area occupied by the submarine cables, or between a line joining North Point and No. 10 battery on the west side, and a line joining Fort Michael and Nicholas Point on the east side.

**Caution.**—It is not advisable to leave boats afloat for too long a time in this harbor as it abounds with worms which attack the wood.

**Port regulations.**—Vessels must stop before arriving abreast of the guardship in order that they may be visited by the health and customs officers and may receive directions for anchorage.

The only passage into the harbor is between the red buoy and black buoy mentioned above.

Merchant vessels are not permitted to enter the harbor between sunset and sunrise, except from stress of weather, and any vessel attempting to do so will be fired upon.

Vessels under stress of weather wishing to enter at night must, when approaching Vladimir Battery, show two blue lights on that side of the vessel and then anchor for examination before approaching the guardship.

**Measured distance.**—Six pairs of beacons, marking a measured distance of 5 miles, are erected in the harbor and approach for the purpose of testing speed. The front beacons are surmounted by white triangles with the point upwards, the rear beacons by white triangles with the point downwards.

The first pair are situated in Gollandiya Cove; the second on the east side of Sukháya Creek; the third on the south side of the harbor between Artillery and Quarantine Bays; the fourth, without the har-

bor, on the east side of Khersonese Bay; the fifth, on the west side of Streletska Bay; and the sixth, on the west side of Peschana Bay.

The course for running over the distance is marked by a beacon above White Cliff Point in range with the Inkerman Lighthouses bearing 194°.

**Deviation marks.**—Southward of the dockyard, and facing the declivity behind it, is a stone wall, on which are painted vertical red lines, which when in line with the western chimney of the machinery works in the dockyard indicate the bearing of the chimney for every degree from south to 120°.

**Winds.**—During the winter months the prevailing winds in Sevastopol are from the eastward. Sea and land breezes are very regular in the summer, the former blowing from 9 or 10 a. m. and the latter setting in at sunset. Gales are frequent in November and March. They blow especially from the southward, from which direction the harbor is well sheltered. Gales from the northeastward are comparatively rare.

**Pilots.**—There is no regular system of pilotage.

**Sevastopol.**—The town of Sevastopol is situated on the southern side of the harbor, on an eminence dividing Artillery and South Bays. The Cathedral of St. Vladimir, a white building, with gray cupola surmounted by a gilded cross, towers above the other buildings in the town and is a conspicuous object when approaching from seaward. The town is clean and well built, and the shore near Nicholas Point is fronted by a fine promenade.

Sevastopol is now entirely a military port and can only be used by foreign vessels requiring docking or repairs, except by special permission, the commercial port being Theodosia. The population in 1897 was 50,710. The climate is stated to be very healthy.

**Communication.**—Rail to St. Petersburg or Moscow via Kharkof. A line to Yalta is under construction. The steamers of the Russian Steam Navigation Co. call five times a week in summer to and from Odessa and Kertch, touching at intermediate ports. There is weekly communication with Constantinople, and the steamers of the Russian Freight-Transport Co. visit the port regularly. There is telegraphic communication with all parts.

**Storm signals.**—Storm signals are hoisted on a special signal staff, situated in the upper part of the town near the house of the commander in chief.

Bulletins giving the state of the weather in the Black Sea and Sea of Azov are posted up daily on Ekaterininski Quay.

**Time signal.**—A time ball is dropped daily from the mast near the commander in chief's house at noon, Pulkova mean time, corresponding to 0 h. 12 m. 47.5 s. Sevastopol mean time, and to 21 h. 58 m. 41.4 s. Greenwich mean time.

A ball is also dropped at the observatory on Paul Point. It is hoisted at 5 minutes before noon, Pulkova mean time, and dropped at noon.

Seamen are recommended to use the observatory time ball for rating their chronometers in preference to the other one.

**Coal and supplies.**—The Government and the Russian Steam Navigation Co. maintain stocks of coal for their own use, but there is no provision for the supply of coal, liquid fuel, or fresh water to foreign vessels.

**Docks.**—There is a depositing (sectional) dock, 280 feet long and 72 or 144 feet broad at entrance, with 20 or 22 feet over the blocks. This dock can take a vessel 400 feet long and is equal to a weight of 4,200 tons.

The Alexievsay dry dock is 599 feet long overall, 500 feet on the blocks, 85 feet wide at the entrance, and has 27 feet water over the sill. A vessel of 10,181 tons, with 27 feet greatest draft, has been docked in it. The Alexandra dock is 553 feet long overall, 85 feet wide at entrance, with 30 feet water over the sill.

There are two slips, one available for vessels up to 500 tons; the other can take vessels up to 1,500 tons. These docks and the patent slips can be used by merchant vessels when not required for men of war. (See also Dock book.)

**Repairs.**—Ironclads of 12,000 tons have been built in the dock-yard for the Russian Navy. Engines and boilers can be constructed, and there is a large factory for repairing machinery. There are sheers lifting 80, and floating cranes lifting 100, 60, and 30 tons, also a pontoon for masting vessels.

**Quarantine.**—Vessels coming from infected ports are subjected to three days' quarantine, to undergo which they must proceed to Theodosia.

**The coast** from Sevastopol Harbor to Cape Khersonese, nearly 6 miles, trends in a general west-southwesterly direction, and is rocky, moderately high, and deeply indented by several bays.

**Quarantine Bay**, situated  $\frac{1}{2}$  mile west of Alexander Point, is about 600 yards in length from the depth of 10 fathoms at its entrance to 4 fathoms. From thence its form become very irregular to the southward, affording shelter for small vessels from all winds in its numerous windings. The bay may be recognized by the square tower with spire of St. Vladimir Church and by the other buildings of Khersonese Monastery, situated on its western side. The channel at the entrance is less than 200 yards wide, between the 5-fathom curves bordering its points, and to which a berth of 200 yards must be given on entering, as they are surrounded with shoal water; and rocks run off nearly that distance from the eastern point, on which stands the

**Quarantine Fort.** A patch of  $3\frac{1}{2}$  fathoms lies about 500 yards north-northwest from the entrance.

**Khersonese**, a small sandy bay, about 1,200 yards to the westward of Quarantine Bay, has a depth of 4 fathoms at its entrance. A reef extends nearly 400 yards to the northward from its eastern point.

**Streletska Bay**,  $\frac{1}{2}$  mile to the westward of Khersonese, is long and narrow, with a depth of 6 to 10 fathoms. It is about  $1\frac{1}{2}$  miles long, but not more than 400 yards wide at its entrance. Two beacons, marking the termination of the fourth mile of the measured distance, are situated on the western side of Streletska Bay.

**Streletska Shoal** fronts the shore for  $\frac{1}{2}$  mile westward of the entrance to the bay and extends nearly 600 yards seaward. It is marked on its northern side by 2 black spar buoys with conical topmarks.

**Streletska Bay Light**, fixed red, 35 feet above high water, is exhibited from a gray, skeleton stone tower located on the spur of the north mole, east side of the bay.

**Peschana Bay** lies 1 mile to the westward of Streletska Bay, but as the water in it is shallow vessels anchor off its entrance in 6 to 10 fathoms. A small island lies near the head of the bay with foul ground around it.

Two beacons marking the termination of the Inkerman measured distance of 5 miles are situated on the western side of the bay.

**Shoal.**—A black spar buoy with conical topmark marks the northern extreme of a shoal extending from the western point of the bay.

**Dvoinaia (Kazach) and Kamiesh Bays** forms the first large opening to the eastward of Cape Khersonese. There is anchorage in 15 to 20 fathoms, at a distance of  $\frac{1}{2}$  mile off the entrance, on a bottom of muddy sand, where a stranger, if bound in, should anchor, or lie to, until communicated with. On the western side of the entrance to Kamiesh Bay there are two spar buoys, in depths of 5 fathoms. One, marking the northern extreme of the bank extending from the point between Kamiesh and Dvoinaia Bays, is red with inverted cone topmark. The other, black with an upright cone, is situated 350 yards to the south-southeastward of the former. On the eastern side, off the entrance point, there is a red spar buoy with inverted cone in 5 fathoms water.

**Rocks.**—In entering Kazach or Kamiesh Bays the northwest point, and the point that separates them, should not be approached nearer than 500 yards; and no vessel should run up the western or Kazach Bay without a pilot, for this double bay, which looks clear and wide from outside, has a reef of sunken rocks extending nearly 600 yards in a north direction from Dvoinaia Point, the tongue of land which divides the head of Kazach Bay into two parts. In the

outer part of these bays the ground is a muddy sand with gravel and shells, and in less than 8 fathoms the holding ground is bad. In the inner part the ground is more tenacious. Kamiesh Bay is better, both as regards size and safety.

These bays have given shelter to many vessels during the southerly gales, which have always moderated after veering round to  $281^{\circ}$ . How far they may be safe with winds from northward of this point is not known.

A coast guard station, surrounded by trees, stands on the extremity of the point between Kamiesh and Kazach Bays.

**Range marks.**—The foul ground off Kazach Point extends 400 yards from the land. Its northeastern extremity is marked by a black spar buoy with conical topmark. Fort Konstantin, well open of all the points of land on the south shore,  $73^{\circ}$ , clears this shoal.

**Cape Khersonese** (lat.  $44^{\circ} 35' N.$ , long.  $33^{\circ} 23' E.$ ).—The western coast of the Crimea terminates in a low shelving peninsula, the extremity of which is named Cape Khersonese. This cape is bordered by a reef running out about 500 yards to the westward and southwestward, at the edges of which there is a depth of 6 fathoms.

There is good anchorage to the southward of the lighthouse with east, northeast, and north winds.

**Cape Khersonese Light**, revolving white, 108 feet above high water, is exhibited from a white circular stone tower located near the extremity of the cape.

**Fogsignal.**—The fogsignal is a siren, with a bell in reserve.

**Signal station.**—A signal station is established here, and telegrams communicated by the International Code will be forwarded, being paid by those to whom they are addressed.

**Storm signals** (day and night) are shown near the lighthouse.

**Buoys.**—Two black buoys, each surmounted by a cone, are moored in 8 fathoms, westward of the Lighthouse Shoal, 350 yards from the lighthouse.

**Directions.**—A vessel in rounding Cape Khersonese from the southward should keep Cape Feolent, a high perpendicular cliff, open of Cossack Point, a nearer and lower bluff, until the lighthouse on the cape bears  $100^{\circ}$ , or Fort Konstantin is seen well open of the north coast of the peninsula. Then a  $61^{\circ}$  course will round the cape and clear all the dangers off the points, none of the rocky ledges (which it is difficult to know the position of, on account of the uniform appearance of the coast) extending more than 600 yards offshore. As a general rule the points on the north side of the Khersonese Peninsula should not be approached nearer than  $\frac{1}{2}$  mile.

**Cape Feolent.**—From Cape Khersonese the coast is steep to and trends to the southeast 7 miles to Cape Feolent, which is a high

perpendicular cliff, with a sharp conical rock rising from the water on its southeast side. The extremity of the point is only a few feet above the level of the sea. A reef extends off it nearly 300 yards southwestward.

**St. Georges Bay—Anchorage.**—From Cape Feolent the coast becomes more elevated and bends to the eastward, forming St. Georges Bay, where the shore is clear and the water deep. Vessels are induced to anchor there in northwest or west-northwest winds, in about 25 fathoms water, to the southward of the Monastery of St. George, which stands nearly 1 mile to the eastward of the point. The steeple of the monastery church is conspicuous from seaward.

A patch of sand, with 7 to 12 fathoms on it, lies at the foot of a sort of landslip about 200 yards eastward of the Monastery of St. George. This anchorage may be of service to a steam vessel when waiting under the land until a northerly or northeasterly gale moderates sufficiently to allow her to round Cape Khersonese.

**Shoal.**—A shoal, with a depth of 3 fathoms over it, is shown on the chart to be situated in the western part of the bay, 500 yards 56° from the southern tangent of Cape Feolent.

**Aspect of the coast.**—Coming from the southeastward toward Sevastopol the land is very remarkable, forming three capes or headlands. The southernmost cape, Aia, makes as a very high bold bluff, looking very much like the North Foreland, but much higher. The next to the northward, Cape Feolent, is moderately high, with three notches like steps in it, and between these headlands lies the port of Balaklava. Cape Khersonese, the northernmost, is long and low, and will be readily known by the lighthouse on it.

**Landmarks.**—A vertical white stripe, 40 feet long and 14 feet wide, is painted on the cliffs, 56 feet above the water,  $2\frac{1}{10}$  miles northwestward from Cape Feolent.

A white equilateral triangle, base upwards, 14 feet above the water, is painted on the face of the cliff at Cape Feolent.

**Balaklava** (lat. 44° 30' N., long. 33° 36' E.).—The entrance to Balaklava Harbor, which is not easily distinguished, lies about  $4\frac{1}{2}$  miles to the eastward of Cape Feolent, the intervening coast consisting of high steep cliffs of a reddish color, where landing is impossible, except in St. Georges Bay. An old Genoese tower and some ruined fortifications stand on the eastern point of the entrance, and the extremity of the western entrance point is marked by a whitewashed rock.

The port, inclosed by steep and rocky hills of a reddish color, is about  $\frac{3}{4}$  mile long, including its winding, from north to south, and only 120 yards wide at its narrowest part. Nearly one-fourth of it is filled up with muddy flat, which has been carried into the head of



the port by a rivulet running through a valley to the northward. There is a depth of from 15 to 24 fathoms in the channel at its entrance, with a gravel bottom, 6 to 8 fathoms, in its narrow part, 7 fathoms abreast of the town, and 3 fathoms nearly 400 yards from the head of the port, over a muddy bottom, where the mud flat before mentioned has only from  $1\frac{1}{2}$  to 6 feet on it. A small islet, bordered by rocks, lies 400 yards from the head of the harbor and about 70 yards from the western shore.

The town, which stands on its eastern shore, is fronted by a stone quay, near the center of which is a wooden pier with sufficient depth for moderate-sized vessels.

A suburb is situated in the plain northward of the harbor. There is postal and telegraphic communication via Sevastopol.

**Balaklava Rock**,  $1\frac{1}{2}$  miles southeastward of the entrance to Balaklava Harbor, and 350 yards offshore, has 11 feet water on it, and 7 to 11 fathoms are found near. The rock bears  $189^\circ$  from a white mark on a black cliff point in the curve of the bay.

A rock with 4 fathoms over it lies nearly 800 yards  $305^\circ$  from Balaklava Rock.

**Clearing mark.**—The highest round hill over the west side of the port kept open to southward of the southwest point of the entrance, bearing about northwest, leads to the southward of both rocks.

**Outer Anchorage.**—As a general rule good holding ground is not found outside Balaklava in less than 25 fathoms, in which, and in deeper water, the bottom is a tenacious sand. Vessels sometimes anchor near Balaklava Rock for shallower water. In doing so, keep the white streak on the cliff from  $54^\circ$  to  $90^\circ$  to avoid the rock.

**Inner Anchorage.**—The anchorage is abreast the town, midway between the two shores, and in a depth of 7 fathoms, muddy bottom. A vessel anchored here is sheltered from all winds, but in bad weather entrance to the harbor is sometimes difficult.

**Directions.**—A steam vessel should keep in mid-channel and proceed at a moderate speed, as the turns are very sharp.

A sailing vessel entering must be prepared to work quickly, as the space is very limited, and should have her boats ready to take her in tow, as the wind often fails when within the entrance.

With southwesterly winds, violent squalls descend from the hills at the first bend.

Before leaving the harbor the direction of the wind in the offing should be ascertained. Vessels usually get under way in the morning, before sunrise, with the land breeze, which they carry for 5 or 6 miles. A good berth should be given to Cape Aia to avoid being becalmed.

**Cape Aia** (lat.  $44^{\circ} 25\frac{1}{2}'$  N., long.  $33^{\circ} 39\frac{1}{2}'$  E.).—The coast from the entrance to Balaklava curves to the southward, its appearance being that of a long wall of gigantic rocks, about 1,500 feet in height, with a flat and wooded surface, the perpendicular extremity of which is Cape Aia, which bears  $121^{\circ} 8$  miles from Cape Feolent, and is remarkable for its height, steepness, and reddish appearance. When to the northwestward of Sevastopol, Cape Aia is to be seen over the intervening lowland.

**Landmark.**—A white horizontal stripe, 140 feet long and 7 feet wide, is painted on the face of the cliff at Cape Aia, 63 feet above the water.

**Anchorage.**—Vessels sometimes anchor in the bend of the coast at about 2 miles southeast of Balaklava, and they may also shelter themselves under Cape Aia during violent easterly winds, where it will be quite calm, but they will be drifted to the westward by the current, and sudden squalls sometimes come down through the narrow openings of the mountains near Balaklava.

**Laspi Bay.**—Between Cape Aia and Sarich Point, 4 miles, the coast bends to the eastward and forms the little bay of Laspi at the foot of some high mountains, which affords a good anchorage sheltered from west, round by north to southeast, and is much frequented by vessels seeking shelter from the easterly winds which often prevail.

The most sheltered anchorage is about 500 yards from the shore, in 10 fathoms, abreast of the small headland on the southern shore, on which stands a white house belonging to the coast guard. Coasters loading at this place approach nearer the shore at the head of the bay, and moor in about 4 fathoms, over a muddy bottom, which shelves very much from the shore. It is said that at this anchorage the westerly winds seldom blow home. However, those from south-southwest are generally considered dangerous, and a coaster must have good strong hawsers made fast to the shore to secure her against the strong northeasterly winds which sweep down the hills with great violence. The coast from Laspi Bay to Sarich Point is safe to approach, and at Kapkane a clear spring of water is found near the shore.

**Sarich Point**, the most southern projection of Crimea, is of moderate height and bordered by bold and pointed rocks and a rocky bank of sunken rocks, extending 300 yards to the southward, where lies a rock about the size of a boat, named Sarich Rock, or by the Tartars, Chuban Kaya (Shepherd's stone), which is often passed unnoticed, while at other times it assumes the appearance of a formidable projection.

**Sarich Point Light**, alternating fixed and group flashing white and red, 125 feet above high water, is exhibited from a white

cylindrical iron tower located near the south shore of the Crimea on an isolated rock.

**Landmark.**—A white vertical stripe, 40 feet long and  $4\frac{1}{2}$  feet wide and 35 feet above the water, is painted on the cliffs  $\frac{3}{4}$  mile northwestward of Sarich Point.

**Foros Church**, 2 miles eastward of Sarich Point, is conspicuous.

**Coast.**—The southern coast of the Crimea from Cape Khersonese to Yalta is backed by table-lands of bold rocks, almost washed by the sea, and from Yalta to Cape Meganom by mountains of less uniform height, their bases being removed farther from the water's edge.

The coast from Sarich Point to Cape Aitodor is bold to approach, with several little inlets, which afford shelter for coasters with westerly winds, and in the fine season they are protected from those blowing at sea by the mountains on the coast. A depth of 9 fathoms will be found 200 yards from the shore, and 22 fathoms  $\frac{3}{4}$  mile. Care is, however, necessary to guard against the sudden squalls to which some parts of this coast are subject.

**Cape Kikeneiz**, which bears east 10 miles from Sarich Point, is a low and rocky projection, only recognized when running close to the coast. It is bordered by a few rocks, but they lie close to the shore.

**Landmark.**—A white St. Andrew's Cross is painted at a height of 28 feet above the sea on Diva Rock, situated about 1 mile north-eastward of Cape Kikeneiz.

**Coast.**—From Cape Kikeneiz the coast trends  $78^\circ$  for about  $6\frac{1}{2}$  miles to Cape Aitodor, which may be recognized by its lighthouse, and forms a projection between them called Cape Ilmen, lying  $2\frac{1}{4}$  miles from Cape Kikeneiz. Between Cape Kikeneiz and Cape Ilmen several large rocks point out the anchorage near the village of Simeis (Simfis), where vessels lie sheltered from westerly winds in about 3 fathoms, very near the shore, abreast of a beach on which are some houses and stores.

About 1 mile eastward of Cape Ilmen is the village of Alupka, standing at the base of the angle of Ay Petros, or Mount St. Peter, a steep flat rocky hill, 4,046 feet high, which turns suddenly to the northward. The village may be easily recognized by a palace of considerable size, built of gray stone, a church having the appearance of a Greek temple, a pretty mosque, and other buildings surrounded with trees. On the heights between Alupka and Cape Aitodor and near Mount St. Peter are several beautiful dwelling houses, and on the shore an estate named Miskhor; eastward of this is the village of Gaspra, conspicuous from seaward. Small vessels can anchor between Miskhor Estate and Cape Aitodor in a little cove, in 4 fathoms, about 150 yards from the shore, abreast of the last trees in

the Miskhor garden and sheltered from the westward. There is a telegraph station at Alupka.

**Cape Aitodor** (St. Theodore of the Greeks), the round extremity of a long, slightly inclined tract of land, bordered by limestone rocks, 311 feet in height, is bold to approach.

There is landing for boats in a small cove about  $\frac{1}{2}$  mile eastward of the lighthouse behind the eastern extremity of the cape, on which is a conspicuous house.

**Landmark.**—A white equilateral triangle is painted, 21 feet above the sea, on the cliff 600 yards to the westward of the cape.

**Cape Aitodor Light**, fixed white, 315 feet above high water, is exhibited from a yellow octagonal stone tower located at the entrance to Yalta Bay.

**Fogsignal.**—The fogsignal is a bell. (See Light List.)

**Signal station.**—A telegraph station annexed to the lighthouse transmits messages signaled from vessels by the International Code. Replies are not signaled to vessels.

**Caution.**—The height of this fogsignal and the nature of its sound renders it improbable that it will be often heard by vessels approaching the cape.

**Yalta Road.**—From Cape Aitodor the coast trends north-northeastward  $4\frac{1}{2}$  miles to the small town of Yalta. It then turns eastward for about 4 miles to Nikitin Point, which bears  $48^\circ$  from Cape Aitodor,  $7\frac{1}{2}$  miles, forming between them an anchorage named Yalta Road.

From Cape Aitodor the shore is bold to approach until northward of Pototska,  $1\frac{1}{2}$  miles south of Yalta, when a sand bank, with depths of less than 5 fathoms, commences, which fronts the town and extends about 200 yards from the shore within the 5-fathom curve. This bank also borders the shore for some distance to the eastward of the town.

Yalta Road is frequented by vessels, meeting with northeasterly winds, when bound to Theodosia or Kertch Strait. It is open from  $90^\circ$  to  $20^\circ$  west, but although the winds from seaward rarely blow with any strength, the sea often rolls in with great violence, and vessels have been wrecked during the autumn months. It sometimes blows hard from the northwest.

The anchorage is about  $\frac{1}{2}$  mile  $144^\circ$  from the town, in 10 fathoms over sand and mud; but small vessels anchor abreast of the town within the breakwater.

**Harbor.**—A breakwater, 600 yards in length, extends in a southwesterly direction from Kilisi Point at the southern end of the town. There is a depth of from 21 to 25 feet inside the harbor and alongside the breakwater, except at the bend of the breakwater, where there is only 17 feet. Five mooring buoys are placed in the harbor.

**Yalta Light**, two fixed green, 30 and 33 feet above high water, is exhibited from an iron post located on the extremity of the mole.

**Light**.—A fixed and flashing red light, 35 feet above high water, is exhibited from a tower located at the end of the harbor mole.

**Town**.—The town of Yalta stands at the entrance of a beautiful valley in proximity to the finest scenery on the coast, and its white houses and churches may be recognized from a long distance at sea. Between Cape Aitodor and the town may be seen the ruins of the Imperial Palace of Oreanda, situated on a low part of the shore, with high cliffs and tall trees overshadowing it; also the estate and magnificent Imperial Palace of Livadia, situated about 2 miles from Yalta. There is also a smaller Imperial Palace, named Eriklik, on the summit of Mount Megabi, reached by a road either from Livadia or Yalta.

The population of Yalta in 1888 was about 3,000, largely increased in the summer season by visitors.

**Communication**.—Steamers call three times a week in summer and twice a week in winter both up and down the coast. A railway to Sevastopol is under construction. There is a telegraph station.

**Lifeboat**.—A lifeboat is stationed at Yalta.

**Storm signals** are shown from an iron mast at the bend of the breakwater.

**Urzuf**.—Nikitin Point, 4 miles eastward of Yalta, consists of a narrow shingle beach, above which the shore rises steeply and is covered with houses and gardens. The Government botanical gardens are situated on an elevation near this point.

Rocks fringe the point and extend 150 yards from the shore. Thence the coast takes a northerly direction for  $2\frac{1}{2}$  miles to the village of Urzuf, and then curves 3 miles to the eastward to Cape Ayu Dag. The houses of the village stand one above the other in the form of terraces on the western side of a high rock on the seashore, on which are the remains of walls.

There is a post and telegraph office at Urzuf.

**Anchorage**.—The anchorage in Urzuf Road is in about 7 fathoms, over sand and mud,  $\frac{1}{2}$  mile south-southeast of the village. There is good anchorage  $\frac{1}{4}$  mile from the shore, in about 6 and 7 fathoms water, between the village and Adalar Rocks, 170 feet in height, which lie  $\frac{3}{4}$  mile to the eastward of it, and 600 yards to the southward of a white point. The rocks are steep-to, having a depth of  $5\frac{1}{2}$  fathoms in the channel between them and  $4\frac{1}{2}$  fathoms between the inner one and the white point.

Between Adalar Rocks and Cape Ayu Dag the shore bends into the northward, forming a cove, called Kiziltash, which is safe and deep. A vessel loading here with granite for the works of Sevastopol

suffered no injury from a southwesterly wind when it was blowing hard in the offing.

**Cape Ayu Dagh (Bear Mountain)** (lat.  $44^{\circ} 33' N.$ , long.  $34^{\circ} 21' E.$ ), although much lower than the other mountains on the coast, is still remarkable both from its form and color. Seen from the sea, its appearance is that of an island with a round surface, but when close in shore and approaching it either from the eastward or westward it is easy to perceive the form from which it has derived its name, namely, that of a bear lying down. The Greek islanders of the Archipelago call it the Camilla (Camel). Its summit, which rises about 1,800 feet, is covered with trees, and its perpendicular shores may be approached without danger, the water being deep all round.

**Current.**—The usual westerly current is felt at its greatest force near this cape.

**Cape Plaka.**—From Cape Ayu Dagh the coast trends north-northeast for  $2\frac{3}{4}$  miles to Cape Plaka, which is a bluff projecting to the eastward, rising in a conical form to 200 feet above the sea, and which may be recognized by a white square tower which stands on its summit. It is bordered by rocks, some of which are visible, and must be given a berth of more than 200 yards. The coast between forms a bay, in which are the villages of Partenit and Kuchuk Lambat. The former lies  $1\frac{1}{2}$  miles to the northward of the cape, and has a beach sheltered from the west and southwest, with a brook flowing through it. Kuchuk Lambat stands in the bend of the coast formed by Cape Plaka, projecting to the southeast, and is remarkable for its pretty houses.

**Anchorage.**—The roadstead abreast of Kuchuk Lambat village is in great repute among the native coasters. Vessels generally anchor in 10 to 12 fathoms at 400 or 600 yards from the shore, but small vessels may anchor close in, with their anchors laid out to the southeast and southwest, and their sterns secured with hawsers to the rocks bordering Cape Plaka to the westward, which form a kind of jetty, sheltering them from the east-southeastward, but they are exposed to all winds between southeast and south-southwest. The southwest wind often blows with violence through an opening formed by the Ayu Dagh and the other mountains.

**Mount Kastel.**—Between Cape Ayu Dagh and Cape Meganom, which bear from each other east-northeast and west-southwest 35 miles, forming that portion of the southern coast of the Crimea which recedes to the northward, the shore is clean and safe to approach. About 3 miles to the northward of Cape Plaka is Mount Kastel, 1,500 feet high, situated near the coast, covered with trees and very conspicuous.

**Chatuir Dagh.**—The village of Alushta,  $2\frac{1}{2}$  miles northward of Mount Kastel, stands at the entrance of an extensive valley, at the

head of which rises Chatuir Dagħ (Tent Mountain) to the height of 4,970 feet above the sea, 6 miles from the coast. This mountain, the highest in the Crimea, is remarkable by its form and from its being isolated from the chain of mountains which it overtops. Mount Demirdzhi, with a summit of perpendicular rocks, lies 6 miles northeastward of Chatuir Dagħ. Between them rises the bare, steep, and rounded summit of Mount Indek.

**Alushta Anchorage.**—There is anchorage abreast of Alushta Fort, which stands near the village,  $\frac{1}{2}$  mile from the shore, in about 12 fathoms, over a muddy bottom, but this roadstead is open to all winds from east-northeast round by south to south-southwest, and very heavy squalls come down from the mountains.

The anchorage is only visited by vessels which call to load alcohol.

**Alushta Light**, alternating white and red, 60 feet above high water, visible 6 miles, is exhibited from a red tower on pillars located on the southeast shore of the Crimea.

**Coast—Roadsteads.**—About 5, 7, 8, 13, and 19 miles, respectively, northeastward of Alushta are the open roadsteads of Miliya Uzen, Sotera, Kuru Uzen, Tuak, Uskiut, and Kapskhor, which are more or less exposed to winds between east through south to southwest. The bottom, however, affords good holding ground. About 3 miles to the westward of Kapskhor the coast forms a little projection named Choban Kale or Khoban Kalessi, on which stands a ruined tower.

**Sudak Bay—Anchorages.**—About 7 miles eastward of Choban Kale are two other projections, named Chiken Point and Khoba (Koba) Point, and from thence the coast recedes to the northward, forming, between the latter point and Cape Meganom, a large bight, named Sudak Bay, which is divided into three parts. The first division to the westward extends as far as Sudak Point, on which are the towers of the ancient Soldaya. It is bounded by woody mountains, and several buildings are about it.

The anchorage in 9 fathoms, over a muddy bottom, is open from  $110^{\circ}$  to  $166^{\circ}$ . There are 6 and 7 fathoms 200 yards from the shore.

The second part of the bay is bordered by a long and wide beach to the eastward of Sudak Point, a steep rock with a tower on its summit and others on its sides at the entrance to a deep valley.

The anchorage is in 10 fathoms, over a muddy bottom, about  $\frac{1}{2}$  mile from the shore, with Cape Meganom bearing east-southeast, and Khoba point west-southwest. This is preferable to any other berth in the bight as it is a good position from which to get under way.

The third division is between Cape Alchak Kaya (Alar Point) and Cape Meganom and is but little known, for vessels seldom anchor in it, although sheltered from  $260^{\circ}$  through north to  $155^{\circ}$ . A depth of 10 fathoms will be found about  $\frac{1}{2}$  mile from the shore.

**Sudak Light**, alternating green and white, 46 feet above high water, visible white 6 miles, green 3 miles, is exhibited from a yellow hut on pillars located on the southeast shore of the Crimea.

**The town** of Sudak is situated 1 mile from the shore in the valley eastward of Sudak Point and is only partially visible from the anchorage.

**Life-saving station.**—There is a life-saving station, with rocket apparatus, near Sudak Point.

**Communication.**—Steamers between Theodosia and Alushta call here. There is a telegraph station.

**Cape Meganom** (lat.  $44^{\circ} 47\frac{1}{2}'$  N., long.  $35^{\circ} 5'$  E.).—The mountain that forms Cape Meganom is of moderate height, but it may be recognized at a distance from seaward on account of its projection to the southward. It is arid and even, and its sides form three angles. The coast all round is bold to approach, with a depth of 15 to 20 fathoms  $\frac{1}{2}$  mile from the shore.

**Cape Meganom Light**, fixed and flashing white, 324 feet above high water, visible flashing 25 miles and fixed 16 miles, is exhibited from a white octagonal masonry tower located on the extremity of the cape.

**Communication.**—The lighthouse is connected with Sudak by telephone, and telegrams can be forwarded.

**Coast.**—After rounding Cape Meganom the last great rocks of the Crimea will be seen to the northeastward, named Kara Dagh (Black Mountain), beyond which the country is more level. The cape below Kara Dagh is high, with an irregular surface of rocks resembling towers and with a considerable depth around it. At its foot, to the westward, lies the village of Otuz, off which there is anchorage in 12 fathoms, bottom mud and shells.

Eski Dagh (Mount Chalka), situated  $5\frac{1}{2}$  miles  $258^{\circ}$  from Kara Dagh, is 2,100 feet in height and has three summits. The center and highest has the form of a flattened cone and is covered with wood; the others are pointed and bare. This mountain, like Kara Dagh, is visible 40 miles and is a good landmark.

From Kara Dagh the coast again trends to the northward for 3 miles, and then runs to the eastward for 5 miles to Kiik Atlama Point, forming the picturesque little bay of Koktabel at the foot of the valley of that name. It affords excellent anchorage, but is open to the south and southeast. The eastern side of the bay is formed by a narrow point projecting  $\frac{1}{2}$  mile to the southward, to the eastward of which, a little distance from the shore, will be seen two white rocks, like boats under sail.

**Kiik Atlama Point (Stag's Leap)** projects to the southeast, and its extremity is formed by a little hill with steep sides, which, being united to the coast by a low isthmus, gives it the appearance of



an island when seen at any distance. A small portion of rock, detached as it were from its northeast extremity, has the appearance of an inaccessible islet, its separation from the point being about the length of a stag's leap. The point is steep-to and bold to approach.

**Dvuyakorna Bay Anchorage.**—From Kiik Atlama Point the coast falls back 2 miles to the westward, forming Dvuyakorna Bay, called by the Italians Porto Genovese. It is open from  $45^{\circ}$  through east to  $157^{\circ}$ , and has a depth of 7 to 14 fathoms with a mud bottom,  $\frac{1}{4}$  to  $\frac{3}{4}$  mile from the shore, which is bordered in some places by little ridges of rock lying close to the coast.

A small cove, which narrows the isthmus, is formed about  $\frac{3}{4}$  mile to the westward of Kiik Atlama Point. It is about  $\frac{1}{2}$  mile wide and  $\frac{1}{3}$  mile long, and has from 6 to 7 fathoms at its entrance, over sand and mud, and 3 to 4 fathoms at less than 200 yards from the shore. The northeast wind blows right into it.

**Cape St. Elias** lies 4 miles  $22^{\circ}$  from Kiik Atlama Point north-northeast. The land then turns to the northwest for nearly 1 mile to Theodosia Point. Some rocks border the cape, but a depth of 4 fathoms will be found 300 yards, and 10 fathoms  $\frac{1}{2}$  mile to the eastward of it. Shoal water also extends in a northerly direction from Theodosia Point for 450 yards, where there is a depth of  $3\frac{1}{2}$  fathoms. A small white chapel, dedicated to St. Elias, stands on an elevation  $\frac{3}{4}$  mile to the westward of the cape and may be recognized from a long distance.

**Cape St. Elias Light**, alternating white and green, 216 feet above high water, visible white 20 miles, green 10 miles, is exhibited from a white hut on pillars located on the south slope of the cape.

**Fogsignal.**—The fogsignal is a siren. (See Light List.)

**Gulf of Theodosia (Kaffa Bay).**—Cape St. Elias is the southwestern extremity of a deep semicircular bay known as Theodosia Gulf, or Kaffa Bay, formed between that point and Cape Chauda (Tash Kyryk), which lies 17 miles to the eastward, by the coast receding nearly 8 miles to the northward. It has the very convenient depth of 10 to 15 fathoms all over it and 5 fathoms within  $1\frac{1}{4}$  miles of its shores, which are safe and clean to approach.

After passing Cape St. Elias and Theodosia Point, to which a berth should be given of 600 yards, a vessel, with a southerly wind, should immediately haul up for the anchorage, as squalls are frequent from the mountains above the town.

**The roadstead** abreast the town is considered very good, the holding ground being excellent, and it is sheltered from all winds except those from east and east-southeast. These winds send in a heavy swell, which, however, is attended with but little danger. The usual anchorage is to the northeastward of the eastern pierhead in a

depth of 8 fathoms, the bottom consisting of mud with sand and shells.

Vessels in quarantine anchor off the quarantine station.

**Commercial Harbor.**—There is an artificial harbor formed by two moles at Theodosia, having an area of about 26 acres and dredged to a depth of 24 feet, with quayage of 1,349 yards; and alongside the northern side of the western mole the bottom has been dredged to a depth of from 25 to 28 feet. This port in moderately severe winters, especially during the months of January and February, will be closed more or less by ice.

**Theodosia Light**, fixed white, with a red sector, 43 feet above high water, is exhibited from a white cylindrical iron tower located on the head of the east mole.

**Lights.**—Two fixed white lights, 31 feet above high water, are exhibited from a white iron post located at the south angle of the head of the large west mole.

Two fixed white lights, 31 feet above high water, are exhibited from a white iron post located on the north angle of the west mole.

**Theodosia.**—The town of Theodosia, the ancient Kaffa of the Genoese, formerly the largest and most important in the Crimea, stands at the western side of Kaffa Bay, and is connected with Kertch by rail, also with the main railway to Sevastopol by a single line about 60 miles in length. Although prettily situated, as a watering place it is not considered so attractive as Yalta. It has become the commercial port of the Crimea instead of Sevastopol, and in 1900 had a population of 27,236.

**Communication.**—Steamers between Odessa, Kertch, Batum, and intermediate ports call several times a week. Theodosia also is connected to the Russian railway and telegraph systems.

**Coal and supplies.**—In normal times about 1,300 tons of Donetz coal was usually in stock. Coaling is carried out by means of lighters or alongside the quay, where there is a depth of 23 feet.

The supply of fresh water is limited, especially in the summer months, when it barely suffices for local requirements.

**Lifeboat.**—There is a lifeboat stationed near Theodosia Point.

**Quarantine.**—Theodosia is a quarantine station for vessels coming from infected ports and bound for Russian ports in the Black Sea.

The quarantine buildings are situated at the eastern end of the town and are in the old Genoese fortress, several towers of which are still standing.

**Cape Chauda** (lat. 45° 0' N., long. 35° 51' E.), Tash Kyryk of the Tartars and Chiavetta of the Italians, is bordered on its western side by some rocks lying close to the shore. In approaching from the westward it may be recognized by its lighthouse and a round hill

called Mount Dyurmen, which appears connected with it, although lying 5 miles to the eastward. A Tartar village, named Karangat, stands near Mount Dyurmen, southward of which the coast projects and forms the little point of Dyurmen, which bears east by north about 5 miles from Cape Chauda. Between Cape Chauda and Dyurmen Point, foul ground extends nearly a mile from the shore.

**Chaudinski Light**, alternating fixed and flashing white and red, 121 feet above high water, is exhibited from a white quadrangular stone tower located 500 yards from the extremity of Cape Chauda.

The green sector of Kyz Aul Light, visible between the bearings of 60° and 70°, covers the rocks, and the white light in sight leads southward of them.

**Signal station.**—Telegrams signaled by passing vessels are forwarded by telephone to Theodosia for transmission.

**Anchorage.**—There is anchorage in a small inlet to the eastward of Dyurmen Point in 4 fathoms, over mud and sand, about  $\frac{1}{2}$  mile from the shore, sheltered from 247° through north to 90°. From thence the coast again recedes to the northward, and then trends eastward to Mount Opuk, which bears from Dyurmen Point 81°, distant  $11\frac{1}{2}$  miles.

**Mount Opuk**, which rises to a height of 630 feet, may be seen at a great distance, and is sometimes compared to Gibraltar, although it is much lower. Its summit is flat and covered with rocky projections, which have the appearance of fortifications. Mount Opuk can be rounded very closely, and between it and Elchan Kaya Rocks there are depths of 5 to 7 fathoms.

The current here runs strong to the southwestward.

**Anchorage.**—A vessel will find anchorage in 5 to 6 fathoms in the bend of the coast to the eastward of the mount, sheltered from 247° through north to 78°.

**Elchan Kaya or Karavy Rocks.**—The three rocks named Elchan or Karavy lie offshore, about 2 miles 247° of Mount Opuk, and when seen from the southward appear like two vessels and a boat under sail. They are bold close-to, and a vessel may anchor near them, in about 9 fathoms water, with a mud bottom, when waiting for a favorable wind to enter the Kertch Strait.

**Kyz (Kuiz) Aul Point.**—From Mount Opuk the coast line, which consists of landslips, is reddish or gray in color, and trends to the northward and eastward for 6 miles to Kyz Aul Point.

**Kertch Strait Light**, fixed white, with red and green sectors, 204 feet above high water, is exhibited from an octagonal stone tower, with white and black vertical stripes, located on Kyz Aul Point, west side of the entrance of the strait.

**Fogsignal.**—The fogsignal is a bell.

**Signal station.**—Telegrams communicated by the International Code to the signal station at Kyz Aul Light will be forwarded, payment being made by those to whom they are addressed.

**Storm signals** are also shown from the lighthouse.

**Kyz Aul Bank.**—A dangerous horseshoe-shaped bank, about 1 mile in length and breadth, with isolated patches of less than 6 feet, lies southeastward of Kyz Aul Point.

**Buoy.**—A bellbuoy is placed, in about 5 fathoms, close to the southeastern edge of the bank, 1.6 miles from the lighthouse.

A red spar buoy, with inverted cone topmark, is moored close to the bellbuoy.

**Spitfire Rock.**—Another dangerous rocky bank, with 17 feet least water, lies nearly 3 miles to the southeast of Kyz Aul Bank, 5 miles southward of Cape Takil, and is in the fairway to Kertch Strait when coming from the westward. Two shoals, with 25 and 30 feet water, respectively, lie  $1\frac{1}{2}$  miles to the westward of Spitfire Rock.

**Range marks.**—Cape Chauda opens southward of Elchan Kaya Rocks, bearing  $268^{\circ}$ , leads southward of Spitfire Rock, but over the 30 feet shoal mentioned above; and the highest tumulus over Ak Burnu well open of Cape Takil, bearing north, leads eastward of it.

## CHAPTER VII.

### KERTCH STRAIT AND SEA OF AZOV.

**Kertch Strait—Depths.**—This strait, which unites the Black Sea with the Sea of Azov, is 27 miles in length, and varies in width from 8 miles at its southern and northern entrances to only  $\frac{3}{4}$  mile in the narrows between Cape Pavloski (Paul) and Tuzla Spit. It is much encumbered with shallow banks, but a narrow channel has been dredged through, which vessels drawing up to 24 feet are permitted to use.

**Currents.**—There is an almost constant current from the Sea of Azov, having a velocity of 1 to 2 knots. It acquires its greatest strength in spring and autumn, and with a strong east-northeast wind blowing, attains, in the narrows of the strait, a velocity of 5 knots. It runs, however, fairly through.

**Water level.**—A continuance of strong northeasterly winds will increase the depths in the strait by as much as  $2\frac{1}{2}$  feet. Southwesterly winds under the same circumstances will decrease the depths in the strait by 1 foot or more.

After the subsidence of prolonged northeasterly winds, the current in the narrows will be found setting toward the Sea of Azov, and this will continue until the ordinary water level is reestablished.

**Pilots.**—Pilotage is compulsory for all vessels navigating Kertch Strait. Pilots may be obtained at Tuzlo Lightvessel, Kertch, Yenikale, and the guard ship off Yenikale.

Vessels requiring pilots should hoist a signal flag and keep it hoisted until a pilot arrives. In answer to his signal a flag hoisted at the pilot station will indicate that the pilot is on his way to the vessel.

A black ball hoisted instead of a flag indicates that on account of the weather a pilot can not board the vessel. Vessels are not piloted by night.

### WESTERN SHORE.

**Cape Takil** (lat.  $45^{\circ} 6' N.$ , long.  $36^{\circ} 28\frac{1}{2}' E.$ ),  $4\frac{1}{2}$  miles northeastward of Kyz Aul Point, is about 270 feet in height, and forms the southwest extremity of Kertch Strait. The old light tower, painted white with a gray lantern, stands on the summit, and being elevated 330 feet above the sea is a conspicuous daymark.

**Niger Rock.**—Cape Takil is bordered by a reef which, commencing at Kyz Aul Point, extends at first only 400 yards from the shore, but near Cape Takil runs out in a southeasterly direction for about  $\frac{3}{4}$  mile. Near the eastern edge, and  $143^{\circ}$  from the old light tower, is the Niger Rock, with less than 6 feet on it, 1,200 yards from the shore. A depth of 5 fathoms will be found along the edge of the reef, but a vessel not seeing the buoy, which may be adrift, should give Cape Takil a berth of at least 2 miles.

**Buoy.**—A red spar buoy with inverted cone topmark is moored eastward of Niger Rock.

**Coast.**—About  $\frac{3}{4}$  mile to the northward of the northern extremity of Cape Takil the coast falls back a little to the westward, forming a point, abreast which,  $\frac{1}{2}$  mile from the shore, is a reef with only 7 feet over it and 5 fathoms at its edge. To the northward, 4 fathoms will be found  $\frac{1}{2}$  mile from the shore. Another reef, with a depth of 6 feet, lies nearly  $\frac{1}{2}$  mile from the shore,  $3\frac{1}{2}$  miles north-northwest from Cape Takil and abreast of a cliff between Chongelek Point and the coast guard station south of it. Northward of this point is an extensive salt lake, which may be seen from the deck of a vessel over the strip of sand dividing it from the sea. Near the edge of the reef off Chongelek Point there are 5 fathoms water, and the shore from thence to Kamuish (Reedy) Burnu may be approached to  $\frac{1}{2}$  mile, where a depth of 20 feet will be found.

**Kamuish Burnu** (lat.  $45^{\circ} 14' N.$ , long.  $36^{\circ} 26\frac{1}{2}' E.$ ), 91 feet high, situated about 8 miles northward of Cape Takil, will be easily recognized. It is the northern termination of the coast hills, and a coast guard station and mill lie about  $\frac{1}{2}$  mile to the southward of it. A few rocks border the point.

From thence the shore is low and sandy, terminating 2 miles to north-northeastward in a low sandy peninsula, about 400 yards wide, bold to approach, having about 18 feet water off its northern end, 300 yards from the shore. Westward of the peninsula is a lake  $\frac{3}{4}$  mile long, north and south, which has a depth of 12 feet and communicates with the sea by a narrow and shallow channel, only practicable to small coasting vessels, drawing about 5 or 6 feet.

**Range lights.**—Two fixed white lights, 112 feet above high water, are exhibited from a white octagonal stone tower located on Kamuish Burnu.

A fixed green light, 102 feet above high water, is exhibited from the south side of the same tower.

A fixed red light, 164 feet above high water, is exhibited from a white pyramidal stone tower located 1,586 yards  $217^{\circ}$  from the front light.

The green and red lights in range, astern, lead through Burunski Channel.

**Kamuish Burnu (Ambelaki) Bay.**—From the entrance to the lake, mentioned above, the coast trends a short distance to the westward, and then northeastward to Cape Pavlovski (Paul), forming between them the small bay of Kamuish Burnu or Ambelaki, which has a depth of 14 to 18 feet, and affords anchorage in 2 to 3 fathoms 600 yards from the shore, avoiding a bank of 5 feet in the western part of the bay, 400 yards from the shore, near the head of the jetty. The bay is, however, exposed to northeasterly winds.

**Range lights.**—A fixed red light, 105 feet above high water, visible 16 miles, is exhibited from a red square stone tower located at Kamuish, near Lazarett, on the cliff.

A fixed white light, 347 feet above high water, visible 25 miles, is exhibited from a square stone tower located on the cliff west of Churnbash, 5 miles  $247^{\circ}$  from the front light.

These light in range, bearing  $247^{\circ}$  astren, lead through the third reach of the channel.

**Cape Pavlovski (Paul)**, 5 miles northeast of Kamuish Burnu, is of moderate height, with a battery and some buildings on it.

**Lights.**—A fixed blue light, 224 feet above high water, is exhibited from a white square stone tower located on Cape Pavlovski, west side of the strait, 1,600 yards  $248^{\circ}$  from the 364-foot hill.

A fixed red light, 336 feet above high water, is exhibited from a round iron tower on a skeleton truss located 717 yards  $357^{\circ}$  from the fixed blue light.

These lights in range bearing  $357^{\circ}$  lead through Pavlovski Channel to its junction with Burunski Channel.

**Fogsignal.**—There is a gong at the life-saving station. A cannon is fired in response to vessel's signals.

**Lifeboat.**—A life-saving station, with lifeboat, is situated on the shore near the lighthouse.

**Beacons.**—A white stone beacon, 28 feet high and 289 feet above the sea, is situated 286 yards  $340^{\circ}$  from Pavlovski Lighthouse. This beacon, when in range with Cape Pavlovski Lighthouse, is intended to lead clear and westward of Tuzla Bank.

**Kertch Fort** stands on Cape Pavlovski and covers the adjacent heights, which rise 864 feet above the sea.

A small harbor is situated on the northern side of the cape.

**Ak Burnu—Bank.**—One mile to the northeastward of Cape Pavlovski is Ak Burnu, remarkable both for its color and its numerous hillocks, on one of which stands a white house, visible a long distance. At Cape Pavlovski the depth of 15 feet is found about 100 yards from the shore, but from thence a bank of shoal water extends in an easterly direction for about  $1\frac{1}{2}$  miles. One-half mile to the southward and 1 mile east-southeastward of Ak Burnu there is also a depth of

15 feet, and between the latter spot and Ak Burnu there are shoal patches of 6 feet.

**Buoys.**—The southern side of the shoal is marked by three buoys, painted in red and white bands and with inverted cone topmark. The westernmost has three white bands, the next two white bands, and the easternmost one white band. A lightbuoy, painted red and exhibiting a flashing red light, is moored in a depth of 22 feet at the eastern end of the shoal.

**Caution.**—In view of the frequent grounding of vessels entering Kertch Strait, mariners are reminded that this bank can not be distinguished by discoloration of the water.

**Telegraph cable.**—A submarine cable has been laid between Ak Burnu and Taman village, situated on the southern shore of Taman Lake. Its track is marked by black and yellow buoys, each surmounted by a black flag. Anchorage on the range of cable is prohibited.

**Kertch Bay.**—From Ak Burnu the coast falls back 2 miles to the northwestward, forming a deep bay  $2\frac{1}{2}$  miles wide, at the head of which stands the town of Kertch.

The depth in the bay decreases gradually from 20 feet near the eastern extremity of Ak Burnu shoal to 12 feet about 600 yards from the town. The bottom consists generally of mud and weed. The south shore of the bay from Ak Burnu is at first steep, then low and sandy as far as the town. On the low part of the shore are some factories, sheds, and several piers.

On the southern side of the town is Mount Mitridate, on which there is a chapel. Lower down, on the slope of the hill, is a church having the appearance of a Grecian Temple.

**The town of Kertch**, which presents a pleasing aspect, occupies the site of the ancient Greek colony of Panticapæum, once the queen city of the Cimmerian Bosphorus, now Kertch Strait. The name Kertch, or more properly Kerch, is a corruption of the name Kher-seti, which the Turks gave to the fortress erected here by the Genoese. The population in 1897 was about 33,300.

**Harbor works.**—The remains of an ancient mole, 2 or 3 feet under water, extends from near the lighthouse for 300 yards in an east-southeasterly direction.

A new mole, which when completed will extend 1,260 feet from the shore, with a head or arm 420 feet in length, is under construction at the north end of the town. The side walls are each marked, at their outer extremities by a red flag and at night by two red lights, placed vertically. Vessels must not pass within 350 feet of these red flags or lights or between them and the shore. Very little progress has as yet been made with the work (December, 1907). North-



ward of the lighthouse the town is fronted by a quay, extending from which are several piers.

**Dredged channel.**—A channel, 18 feet deep and 47 feet wide, is being dredged into the harbor now under construction. The depth at present (1907) is 14 feet. The channel is marked by buoys surmounted by red flags and exhibiting white lights at night.

The eastern side of the channel is indicated by two columns in range, each 28 feet high, surmounted by a flag by day and by a light by night, situated on the northern shore of the bay about  $\frac{1}{2}$  mile eastward of the town.

**Lights.**—Two fixed red lights, 36 feet above high water, are exhibited from a red circular iron tower located at Kerch, on the elbow of the Genoese Wharf.

Two fixed red lights are exhibited from the pier of the Russian Steam Navigation Co.

**Lightbuoy.**—A red buoy, exhibiting two fixed red lights placed vertically, is moored 400 yards  $132^{\circ}$  from the lighthouse.

**Pilots.**—There is a pilot station near the lighthouse.

**Communication.**—There is steam communication between Kertch and Poti, occupying 48 hours, calling at Novorossisk and Sukhum Kale en route. Steamers run in summer practically every day between the ports of the Black Sea and Sea of Azov; and in winter, according to the severity of the weather. Navigation is usually closed for a period of from 4 to 6 weeks. There is telegraphic communication with all parts; also railway communication.

**Signal station.**—There is a Lloyd's signal station at Cape Zmiini, 3 miles eastward of Kertch.

**Storm signals** are hoisted on a special staff on Mount Mitridate.

**Weather bulletins** showing the state of the weather in the various ports in the Black Sea and Sea of Azov are posted up daily at the customhouse and on the wall of the customs watch house.

**Coal and supplies.**—In normal times about 7,000 tons of native coal were kept in stock, and delivered alongside in barges; but all strong winds, setting up a sea, interfere with coaling. Supplies of sorts could be obtained; fresh provisions were plentiful; the water is not of good quality. No repairs can be executed. In the event of sickness seamen are admitted to the town hospital.

**Quarantine.**—The quarantine establishment,  $1\frac{1}{4}$  miles to the eastward of the town, on Quarantine Point, is marked by a flagstaff. Vessels bound to the Sea of Azov undergo, when necessary, quarantine at Kertch. The quarantine anchorage is between the red buoy off Ak Burnu and the quarantine station. The limit of this anchorage on the side of the town is indicated by spar buoys surmounted by brooms.

Vessels arriving at Kertch will be boarded by the health officer, and officers in command are not to communicate with the quarantine office to obtain pratique. Vessels requiring disinfection must proceed to Theodosia or Odessa for the purpose.

Vessels outward bound must await the visit of the customs officer under penalty of a fine. Pratique is granted opposite the fortress and not at the Yenikale end of the channel.

The hatches of vessels bound to ports in the Sea of Azov are sealed at Kertch.

**Kertch Road—Anchorages.**—Naval vessels anchor off the principal pier southward of the lighthouse.

Merchant vessels anchor in the bight northward of the old mole according to their draft. The bottom is very soft.

Vessels completing their cargoes generally anchor southward of Ak Burnu Bank, in Tuzla or South Road, southward of and not less than 200 yards from the range of leading lights for the Kertch-Yenikale dredged channel in a depth of from 21 to 23 feet. Vessels are permitted to load to a draft of 22 feet.

**Prohibited anchorages.**—Vessels are prohibited from anchoring in the dredged channels, or within the limits of the sector of light shown from Kertch Lighthouse, or in the vicinity of the telegraph cable from Ak Burnu to Tuman.

**Cape Zmiini** is situated on the northern shore of the bay, 1 mile eastward of Quarantine Point. Some rocky patches, with 4 feet water over them, lie 500 yards east-southeastward from the point, and are marked on their southwestern side by a red spar buoy with inverted cone topmark moored in a depth of 13 feet.

There is a landing quay 600 yards northwestward of the point.

**Lloyd's signal station** stands on Cape Zmiini. The signal mast, which is elevated 164 feet above the sea, has its lower part painted white and the upper part black. The lookout house, near the flagstaff, is painted white.

**Yenikale.**—The town of Yenikale stands on a point at the narrowest part of Kertch Strait, about  $5\frac{1}{2}$  miles to the eastward of Kertch and about the same distance east-northeast of Ak Burnu. A fortress is erected on the curve of a steep shore, which gives the point a peculiar appearance.

A broad sand flat, with 4 to 12 feet, which begins 1 mile to the westward of the town and terminates at the point, extends  $\frac{3}{4}$  mile to the southward as far as the dredged channel.

**Anchorage.**—A vessel seeking an anchorage off Yenikale may approach the fortress and the sandy shore to the northward of it, which is named by the Russians *Opasnaya* (dangerous), to within  $\frac{1}{2}$  or  $\frac{3}{4}$  mile, where there is a depth of about 15 feet. Vessels from the

Sea of Azov used formerly to anchor here and discharge part of their cargoes to enable them to pass the shallows to the southwestward, but the dredged channel is now navigable by vessels of 20 feet draft.

**Krugoi Bank**, situated about 1 mile  $146^{\circ}$  from Yenikale Point, is  $1\frac{1}{2}$  miles in length and about  $\frac{3}{4}$  mile in breadth, with depths of 7 to 12 feet over it. Its northern edge has been dredged to a depth of 20 feet, forming a part of the Kertch-Yenikale Channel to the Sea of Azov.

**Buoys.**—A spar buoy, painted red and white and surmounted by a red flag over a white flag, is moored on the southeastern side of this bank, at about  $\frac{1}{2}$  mile to the southward of Yenikale Point.

A black and white buoy, surmounted by a checkered ball, is moored in 8 feet of water on the northern end of Krugoi Bank and on the southern side of the dredged channel.

**Pilots.**—The headquarters of the Kertch Strait pilots is at Yenikale.

There is a pilot station in the town, also on board the guardship.

**Depth signals**, to indicate the depth of water in the Kertch-Yenikale dredged channel, are made by the International Code from a signal mast at the pilot station in the town and are repeated from the guardship.

**Lifeboat.**—A short distance southwest of the town there is a lifeboat and rocket station, consisting of several buildings of white stone.

**Cape Yenikale.**—Cape Yenikale (Fonar), which lies about  $2\frac{3}{4}$  miles northeastward of Yenikale, is steep and rocky. Between the cape and Opásnaya Beach there is a depth of 8 feet in a little inlet formed by the shore receding to the westward. Mount Khronia, which rises 2 miles to the westward of Cape Yenikale, has a long crest, at the eastern end of which is a conspicuous small summit.

**Cape Yenikale Light**, flashing white with a red sector, 409 feet above high water, visible 27 miles, is exhibited from a circular stone tower located at the west side on the north entrance to Kerch Strait.

**Shoal.**—A shoal about 30 yards in extent, with a depth of 18 feet and 24 to 25 feet around, lies with Cape Yenikale Lighthouse bearing  $326^{\circ}$ ,  $1\frac{3}{10}$  miles.

**Buoy.**—The position of the shoal is marked by a black and white spar buoy surmounted by a black ball.

**Telegraph cables.**—Submarine telegraph cables cross the strait from a point 800 yards northward of Cape Yenikale Lighthouse to Kosenko farm, on the opposite shore. Vessels are prohibited from anchoring in their vicinity.

**Cape Khroni**, situated  $4\frac{1}{2}$  miles  $337^{\circ}$  from Cape Yenikale Lighthouse, is high, rounded, and sloping, and forms the western entrance point of Kertch Strait from the Sea of Azov.

## EASTERN SHORE.

**Cape Kishla**, also known as *Zhelyezni Rog*, the southeastern point of Kertch Strait, is reddish in color with a flat summit and steep cliff, and lies at the foot of a hill between Bugaz Channel (the mouth of Kuban Lake) and Cape Panaghia.

**Outlying dangers—Kishla Reef.**—About  $2\frac{1}{2}$  miles  $140^\circ$  from Cape Kishla is Chernyshef, an 18-foot isolated patch, which is the southeast extreme of a long and narrow reef, named Kishla, which thence curves for  $2\frac{1}{2}$  miles northwestward toward Cape Kishla, from which its northern extremity bears  $213^\circ$ ,  $\frac{3}{4}$  mile. This reef as well as those westward of it is the more dangerous as the cape is not easily recognized, having nothing on it to distinguish it from the rest of the coast, which has the same bold appearance. It has patches with depths of 5 to 18 feet, with 5 fathoms at its edges, and there is a depth of 5 to 7 fathoms between the reef and the rocks which front Cape Kishla, which rocks extend 3 miles to the eastward of it and  $\frac{1}{2}$  mile from the shore. There is a depth of about 4 fathoms between the northern end of Kishla Reef and the cape.

About 3 miles westward of the center of Kishla Reef several rocks exist.

**Highflyer Rock (Southeast Aksenof)**, over which the depth is 14 feet, lies 3 miles  $230^\circ$  from Cape Kishla. A patch of 28 feet, named Northwest Aksenof, lies  $312^\circ$ , 2.1 miles from Highflyer Rock.

**Buoy.**—A black spar buoy, with conical topmark, marks the western side of Highflyer Rock.

**Volski**, a patch of 18 feet, lies nearly  $1\frac{1}{4}$  miles east of Highflyer Rock; another, with 24 feet, named Viper (Savenko) Rock, lies 1.2 miles southeast; and a third, Andreyef, of 28 feet,  $2\frac{1}{4}$  miles east-southeast from the same rock; but it is probable that all the ground between Highflyer Rock and Cape Kishla is foul.

**Clearing marks.**—Vessels should pass outside these dangers by keeping Cape Tuzla well open to the westward of Cape Panaghia, bearing  $343^\circ$ , or at night by keeping in the sector of light shown from Pavlovski Lighthouse.

**Cape Panaghia** lies  $4\frac{1}{2}$  miles west-northwest from Cape Kishla, and nearly midway between them a spit of about 3 fathoms extends  $\frac{1}{2}$  mile from the shore, but the whole space appears to be foul ground and should be avoided. In passing the cape give it a berth of 2 miles to avoid the foul ground off it.

**Fulton Rock.**—From Cape Panaghia a ridge of rocky pinnacles above and below water extends  $275^\circ$ , the outermost of which, named Fulton (Trutaeva) Rock, is nearly  $1\frac{1}{2}$  miles from the cape and has only 3 feet over it.

**Clearing mark.**—All these dangers will be cleared by keeping Cape Yenikale Lighthouse open of Cape Tuzla, bearing  $11^{\circ}$ .

**Buoy.**—A black spar buoy with conical topmark is placed westward of Fulton Rock in a depth of 40 feet.

**Cape Tuzla**,  $3\frac{1}{2}$  miles  $337^{\circ}$  from Cape Panaghia, is steep, and from it a ridge of dangerous rocks extends for nearly  $\frac{1}{2}$  mile to the westward.

Between Panaghia Rocks and Cape Tuzla the coast should be given a berth of over 1 mile to avoid the rocky bank which extends offshore, in one place to as much as  $\frac{1}{2}$  mile. Some of the rocks on the bank are awash; others have from 5 to 8 feet over them. Two patches of 16 feet lie, respectively,  $275^{\circ}$  1 mile and  $281^{\circ}$  1.7 miles from Cape Tuzla.

**Lightvessel.**—Tuzla Lightvessel exhibits two fixed white lights, one from each mast, 32 feet above water, visible 9 miles; straw color, black ball at each masthead is anchored near entrance to Pavlocski Channel, 6.5 miles  $108^{\circ}$  from Kamuish Burnu front light.

**Fogsignal.**—The fogsignal is a bell.

**Tuzla Spit and Bank.**—A narrow sand spit 7 miles long stretches out to the northwestward from a position 1 mile northeastward of Cape Tuzla, in the direction of Cape Pavolsks, and nearly bars Kertch Strait, leaving a passage of only  $\frac{1}{2}$  mile in width between the bank which prolongs it and the cape. There are some fishermen's huts on the spit, also a coast-guard station, and 6 miles northwestward of Cape Tuzla there is a beacon. At the outer end of the spit is a sunken stone barrier with a depth of only 6 feet over it.

Tuzla Bank, which borders the spit, has a depth of 2 fathoms about  $\frac{1}{2}$  mile from the western side of the spit, and 3 fathoms from  $1\frac{1}{4}$  to  $2\frac{1}{4}$  miles distant. The depth on the portion of the bank southward from the extremity of Tuzla Spit is only 14 or 15 feet.

**Lightbuoy.**—A black buoy, exhibiting an occulting white light and surmounted by a whistle and lantern, is moored about 1,000 yards  $314^{\circ}$  from the west end of Tuzla Spit.

**Fogsignal.**—The fogsignal is a whistle sounded by the motion of the waves.

**Buoys.**—The western side of the Tuzla Bank is marked by five black spar buoys surmounted by cones. These buoys mark the eastern side of the channel.

The Tuzla Bank buoys are not withdrawn during winter.

Three red buoys, surmounted by hourglass topmarks, mark the southern limit of the spoil ground southward of Tuzla Spit.

A black target buoy surmounted by a flag has been moored 1,700 yards west from the Tuzla Spit Beacon. It is removed in winter.

**Clearing mark.**—Should the light-and-whistle buoy be missing, the northwestern extremity of Tuzla Bank will be cleared by keeping Kamuish and Churubash Lighthouses in range, 246°.

**Anchorage.**—Anchorage will be found to the southward of Tuzla Bank when northeast winds or the strength of the current prevent vessels from turning to windward. Large ships anchor to the westward of Cape Tuzla in from 30 to 40 feet water.

Vessels also anchor in Tuzla or South Road, to the northeastward of the light-and-whistle buoy and to the southward of the range for the Kertch-Yenikale dredged channel. Two patches, with 18 and 19 feet over them, respectively, lie in this anchorage. Each is marked by a black and white checkered spar buoy surmounted by a ball.

**Caution.**—Vessels entering or leaving this anchorage must not pass southward of the whistle-and-light buoy marking Tuzla Spit as it is moored close northwestward of a sunken stone barrier on which there is a depth of only 6 feet.

**Taman Lake.**—Eastward of Tuzla Spit is an inlet, known as Taman Lake, which extends 20 miles in an east-northeast direction and is from  $3\frac{1}{2}$  to 7 miles in breadth.

The town of Taman stands upon the south shore of the lake about 5 miles from Cape Tuzla. The coast between is bordered by rocks, but there is a depth of 12 feet  $\frac{1}{4}$  mile from the shore. There is a telegraph station in the town.

About 1 mile to the eastward of Taman stands Phanagoria Fort, and thence the coast trends nearly 2 miles northeastward, where Markitan Spit, a tongue of sand with 3 to 12 feet, projects 1 mile to the northward, nearly meeting a similar spit which extends  $2\frac{1}{4}$  miles southward from Rubanova Point, thus dividing the lake into two parts and leaving only a narrow passage, with a depth of 13 feet, between them. The eastern part of the lake, which is nearly 10 miles long,  $3\frac{1}{2}$  miles broad, and carries a depth of from 12 to 16 feet, over mud and shells, affords excellent shelter from all winds, but it is not frequented.

**Buoys.**—The entrance to the lake from Kertch Strait, which is  $\frac{3}{4}$  mile wide and has a depth of 14 feet, is marked on the southern side nearly abreast of Tuzla Beacon by a black spar buoy, with upright cone topmark, and on the northern side by a red spar buoy with inverted cone topmark.

**Chushka Spit** is a tongue of sand stretching 9 miles in a southwest direction from a point  $4\frac{1}{2}$  miles southwestward from Cape Kamennoi, which is the northern extremity of the coast of Taman. Its western edge is even and straight, but on its eastern side there are many indentations which vary in breadth from 100 to 1,000 yards. A flat, which carries a depth of from 12 to 4 feet, surrounds

it, and at its southern end projects nearly 3 miles northwestward toward Kertch. The channel to Taman Lake lies between this bank and Tuzla Spit. Ak Burnu on a  $306^{\circ}$  bearing astern, leads through between the red and black spar buoys on the adjacent sand banks.

**Buoys.**—A spoil ground between Krugoi Bank and Chushka Spit is marked by four black spar buoys, each surmounted by two cones, bases toward each other.

**Cape Kamennoi.**—From the northern end of Chushka Spit the coast trends in a  $33^{\circ}$  direction for 2 miles, when it turns to the eastward, forming Cape Akhilleon. Three miles eastward of this point is Cape Kamennoi (Rocky), which forms the eastern point of entrance of Kertch Strait and is of moderate height, steep, and of a reddish color. These capes are bordered by rocks, which will be avoided by keeping not less than 1 mile from the shore, where a depth of 5 fathoms will be found.

**Dredged channels.**—A channel has been dredged through the banks in Kertch Strait. It consists of three sections, known as the Pavlovski, Burunski, and Kertch-Yenikale Channels, respectively.

The three have a depth under ordinary circumstances of 24 feet and a breadth at the bottom of from 350 to 420 feet, which at their junction is increased to 490 feet.

The depth in these channels is influenced by the direction of the wind, northeasterly winds increasing, and southwesterly winds decreasing the depth.

**Pavlovski Channel**, the outer section, commences  $3\frac{1}{2}$  miles  $176^{\circ}$  from Pavlovski Lighthouse. The Tuzla Lightvessel marks this position. The beacons southward of Pavlovski Lighthouse kept in range, bearing  $356^{\circ}$ , lead through the channel, which is about  $2\frac{1}{2}$  miles long.

**Burunski Channel**, the second section, joins the northern end of Pavlovski Channel and is 2 miles in length. The beacons near Kamuish Burnu, kept in range, bearing  $217^{\circ}$ , lead through the channel which terminates abreast of Cape Pavlovski, when Kamuish and Churubash Lighthouse come into range, bearing  $246^{\circ}$ .

**Kertch-Yenikale Channel** commences  $1\frac{1}{2}$  miles east by south from Ak Burnu and is nearly 6 miles in length. Kamuish and Churubash Lighthouses kept in line, bearing S.  $66^{\circ}$  W., lead through the channel until its termination about  $1\frac{1}{2}$  miles southward of Cape Yenikale.

This channel cuts through the shoal tongue extending in a southwest direction from the town of Yenikale, leaving 8 to 9 feet on the north, and the point of the shoal with 12 feet on the south side of the channel. It also cuts into the north extreme of the Krugoi Bank, where there is a depth of 8 to 9 feet, opposite which, and on the north side there is a small patch of 12 feet. With these exceptions the depths on either side are from 13 to 17 feet.

**Buoys.**—The buoys marking the various banks in Kertch Strait have already been mentioned when describing the shores of the strait.

The dredged channels are marked on the starboard hand, when proceeding from the Black Sea to the Sea of Azov, by black spar buoys surmounted by upright cones, and on the port hand by red spar buoys surmounted by inverted cones. These buoys are placed in pairs.

A black spar buoy surmounted by a black flag marks the western end of a 17-foot shoal situated on the southern side of the western entrance to Kertch-Yenikale Channel, and a black buoy, 125 yards farther eastward, marks the south side of the entrance to the channel. The eastern (Sea of Azov) entrance to the channel is marked on the southern side by a black buoy, and on the northern side by a red buoy.

Southward of the dredged channel, abreast of the bank extending southward from Yenikale, the old channel is marked by two red buoys on its northern side and two black buoys on its southern side.

On the northwestern shore of Kertch Strait, between the country house of Suvorovski and the Opasnaya coast guard station, a row of small buoys, with red flags as topmarks, are laid out annually, about 1,200 yards from the shore, from October 1 until navigation is closed by ice, to mark the fishery limits.

**Caution.**—The buoys are not to be depended on, as they are not always in position at the opening and closing of navigation and, moreover, are liable to be carried away by vessels fouling them.

**Directions.**—Pilotage is compulsory for merchant vessels.

Vessels proceeding from the Black Sea to the Sea of Azov by the dredged channel, after passing on either side of Tuzla Lightvessel, should leave the black spar buoys on the starboard hand and the red spar buoys on the port hand, and follow the range marks for the various channels, as given above and on the chart.

If bound for Kertch Road, from a position midway between Cape Takil and the shoals westward of Cape Panaghia, steer 338° until Pavlovski Lighthouse is in range with the beacon at its rear bearing 345°. Keep these objects in range until Mount Temir Oba is in range with Ak Burnu 23°, when they should be steered for on this bearing until Cherubash and Kamuish Lighthouses are in range 245°. This latter mark leads between Tuzla Pit and Cape Pavlovski. When past the red buoy marking the east extreme of Ak Burnu Shoal, or when the chapel on the summit of Mount Mitridate is in range with the church resembling a Grecian temple on its slope, bearing 132°, a vessel can steer for the anchorage.



At night, when approaching from the southward, the dangers on either side of the southern entrance will be avoided by keeping Cape Pavlovski Light in sight between the bearings  $353^{\circ}$  and  $331^{\circ}$ .

**Regulations.**—The following regulations are in force for the guidance of vessels using the dredged channel:

1. Vessels drawing less than 13 feet are to pass by the old channel.
2. Vessels of a greater draft than 13 feet are only allowed to navigate the dredged channel at certain times as follows:

(a) If bound to the westward (Sea of Azov to the Black Sea), from sunrise to 8 a. m. from May 14 to September 14, and to 9 a. m. from September 14 to May 14, and from 1 to 5 p. m. all the year round. (b) If bound to the eastward (Black Sea to Sea of Azov), from 9 a. m. to noon from May 14 to September 14, and from 10 a. m. to noon from September 14 to May 14, and from 6 p. m. to sunset all the year round.

A red flag will be hoisted on board the guardship below the latter's own flag, when vessels may pass through the dredged channel. This signal will be repeated by the dredger.

The beacons marking the channel will be removed, if necessary, for dredging purposes.

3. Vessels approaching the dredger must sound three prolonged blasts on the whistle or siren.

4. Vessels are not to pass inside the area of the dredging operations, which is marked by special buoys.

During the period when vessels may pass through the channel there will be at least 140 feet of space between the anchorage of the dredger and the side of the channel, while the chains of the dredger will be slackened on the side on which a vessel is passing. The barges lie on the outer side of the channel.

5. Steam vessels while passing the dredger must stop their engines.

6. Sailing vessels navigating the channel with a draft of more than 13 feet must, in the event of a contrary wind or other unfavorable circumstances, either take a tug or wait for a favorable wind, and shall only pass through the channel within the times mentioned in paragraph 2.

7. The entry into the channel or passage through it is absolutely forbidden during fog, thick mist, or bad weather.

By night the anchorage of the dredger is indicated by two electric lights.

8. Coasting vessels which have received permission to pass through the channel at night, when approaching the dredger, must leave the channel.

9. The guard ship and pilot master are responsible that the present obligatory regulations are carried out exactly.

10. Any person infringing these regulations, in addition to a penalty, will be responsible also for all damage caused to the dredger and her attendant vessels.

#### SEA OF AZOV.

**Temriuk Bay.**—Cape Pekli lies about  $3\frac{1}{2}$  miles east-southeastward from Cape Kamennoi, and thence the coast continues east-southeastward for 20 miles to the entrance of the Temriuk Lakes, situated at the bottom of Temriuk Bay. The coast east of Cape Pekli is lower than to the westward and intersected by several little ravines. About  $10\frac{1}{2}$  miles southeastward of Cape Pekli a large opening, choked with sand, will be seen, named Akhtanizovka, the eastern side of which is formed by a narrow portion of land 9 miles in length, of little height, terminating eastward in another collection of sand, at the extremity of which lies the entrance to the lower Temriuk Lake.

On the neck of land between the Aktanizovka entrance and the entrance to the Temriuk Lakes is a small eminence which appears like an island.

**Temriuk Bank—Buoy.**—A bank, with 9 feet water, composed of hard sand, extending 1 mile in a north and south direction, 200 yards wide, lies in the fairway of Temriuk Bay, about 11 miles to the eastward of Cape Pekli and  $2\frac{1}{2}$  miles from the nearest shore. It is marked by a black spar buoy with conical topmark, placed, in 22 feet water, about  $\frac{1}{2}$  mile to the northward of it.

**Caution.**—The vicinity of the small eminence eastward of Aktanizovka is a center of volcanic disturbance, and new islets are sometimes formed. In October, 1880, a small island was upheaved 300 yards from the shore, its appearance being accompanied by steam and smoke.

The island, which was elevated 10 feet above the sea, disappeared in the course of the following winter, and in the spring had become a shoal with a depth of about 1 foot over it.

This was the third upheaval of an island within the memory of living inhabitants.

**Temriuk.**—The town of Temriuk stands on the western extremity of the peninsula, which divides the upper Temriuk Lake from the lower. It exports grain and fish and has a population of about 15,000 people. There is a telegraph station.

Near the town the lakes communicate by a narrow channel, through which the waters of the upper or western lake, fed by branches from Kuban River, flow with great rapidity into the lower. The lakes are very shallow and only navigable by flat-bottomed boats. The upper lake is called Akhtanizovka Liman, and the lower Lake Kurchan Liman.

There are two wooden piers on the western entrance point to the lake. Steamboats of light draft take passengers and cargo up to Temriuk.

**Temriuk Light**, group flashing white, 213 feet above high water, visible 20 miles, is exhibited from an openwork iron tower located at Temriuk.

**Harbor works.**—A harbor is in course of construction at Temriuk, which will be reached from seaward by a channel 12 feet deep, cut through the spit into the lake. The entrance is protected by two breakwaters, which extend from the shore in a northwesterly direction for a distance of about 550 yards.

**Anchorage.**—In the month of May vessels arrive for cargoes of fish, for which these lakes are celebrated. They anchor in the bay,  $1\frac{1}{2}$  miles from the entrance, in 16 or 17 feet water, over mud and sand, with Temriuk Church (which is conspicuous, and visible at a good distance from the shore) bearing about  $191^{\circ}$ .

The anchorage is open from west through north to northeast, but shipwrecks are rare. The strong current setting out of the lakes tends to keep vessels from being thrown on the coast.

**Temriuk Harbor Light**, fixed green, 18 feet above high water, is exhibited from a box on framework located on the dam at the head of the port.

A fixed red light, 55 feet above high water, is exhibited from a box mounted on a framework located 920 yards  $140^{\circ}$  from the front light. These lights in range lead through the entrance channel.

**Coast.**—Eastward of Temriuk the coast, which is low, marshy, and covered with reeds, has numerous fishing stations on it, and trends to the northward and eastward for 30 miles to Achuev, situated on the southern side of the northern branch of the Kuban River, which is named Protok (Cherno Protok).

Achuev is also a fishing station, and is bordered by a great extent of marshy country which prevents all communication with the country inland.

The mouth of the Protok River is about 650 feet wide and has a depth of about 3 feet. Within the bar the river has depths of from 6 to 12 feet.

Vessels may anchor abreast the mouth of the Protok River 2 miles from the shore, in a depth of 4 fathoms, and also abreast Sladkii (Sweet) Rivulet, 7 miles to the southwestward.

Depths of 15 to 20 feet will also be found along the coast as far as Akhtar Lake, 25 miles to the northward of Achuev, to the northeastward of which the land becomes a little more elevated and is marked by two hills.

**Akhtar Bay.**—From Akhtar to Kamishevataya Point, which bears north-northwest 23 miles, the coast falls back to the eastward

and forms the large bay of Akhtar, 12 miles long, but its shallowness deters vessels from approaching its shores. A depth of 16 feet will, however, be found from 5 to 7 miles from the coast. There is a telegraph station in Akhtar village.

Steamers usually anchor about 9 miles from the coast, the cargo being brought off in steam barges.

**Akhtar Light**, alternating red and white, 56 feet above high water, is exhibited from an iron framework tower located north of the town.

**Beisug Harbor**.—Eastward of the bay is Beisug Liman, a lake about 18 miles in length, the entrance to which is nearly closed by a projecting spit of sand, about 7 miles long, extending from the southern shore. A fishery station is established on this spit about 4 miles from its northern extremity. The Beisug River flows into the lake.

**Kamishevataya Point** is the northern extremity of Aktar Bay just described. Mills are situated near the point, eastward of which is a church and village. A spit of sand extends southeastward,  $3\frac{1}{2}$  miles, from Kamishevataya Point, beyond which to the southward,  $2\frac{1}{2}$  miles, there is a depth of 18 feet.

**Zhelyezin Bank**, of sand and shells, about 15 miles in length in a northwest and southeast direction, with general depths of from 19 to 23 feet and a least depth of 17 feet, is situated 23 miles  $236^{\circ}$  of Kamishevataya Church. From this bank a ridge of shoal water, with a depth of 21 feet on its outer end, extends in an easterly direction to the shore. Two miles westward of Zhelyezin Bank the depth is about 30 feet.

**Dolga Point**.—From Kamishevataya Point the coast becomes slightly elevated and trends north-northwestward for 15 miles to Dolga (Long) Point, from whence Dolga Spit, a sandy projection 9 miles in length, extends in a northwesterly direction. Southward of Dolga Point is a hill or cliff at the foot of which is a church and village.

**Yelenina Spit**.—Two banks project off Dolga Point. The first Yelenina Spit, with from 6 to 17 feet water and triangular in shape, extends  $258^{\circ}$  for 15 miles from the point. There is a patch of 6 feet at 7 miles from the shore, 8 feet at 11 miles, and only 17 feet at 15 miles. A bank which is the continuation of this spit extends 11 miles farther in the same direction when a depth of 30 feet will be found.

**Lightbuoy**.—A black conical buoy, exhibiting a fixed white light, is moored in 38 feet,  $13.8$  miles  $115^{\circ}$  from Berdiansk front light.

**Fogsignal**.—The fogsignal is a bell.

**Dolga Bank**, the second of those mentioned above, runs off in a northwesterly direction for 6 miles from Dolga Spit, with depths of from 6 to 9 feet, the former depth being found only a short distance within its outer extremity.

**Lightbuoy.**—A black iron buoy, exhibiting an occulting white light, is moored 7.5 miles  $118^{\circ}$  from Byelosarai Light.

**Fogsignal.**—The fogsignal is a bell sounded by the motion of the waves.

**Gulf of Taganrog,** or of Azov, extends 70 miles to the eastward from Dolga Spit, and varies in width from 28 miles near its entrance to 12 miles near its head. In this gulf are situated the principal ports in the Sea of Azov, viz, Taganrog, Mariupol, and Yeisk. To these may be added Rostov, situated on the right bank of the Don River, which flows into the head of the gulf 25 miles below that town.

The shores of the gulf are flat, uniform in appearance, fronted by landslips of clay, and rarely broken by ravines. Villages and farm-houses are numerous and are useful for ascertaining a vessel's position.

The gulf is divided into three basins, formed by the different banks which border its shores. The first is that of Mariupol, bounded by Dolga and Byelosarai Spits to the westward and by Peschani and Krivaya Banks to the eastward. The second is the Sazalnik Basin, which is formed between the latter banks and Chimbura and Petrushina Banks to the eastward. The eastern basin is that of Taganrog, which lies at the head of the gulf.

**Caution.**—Great caution should be exercised when approaching the several low spits in the Gulf of Taganrog, especially at night, as they are scarcely discernible, and several vessels have stranded on Byelosarai Spit when leaving the gulf for want of proper precautions.

**Wrecks.**—Owing to the shallowness of the gulf and its approach the wrecks that occur form serious obstructions to navigation. Vessels bound for ports in the gulf should therefore proceed with great care, especially when in the vicinity of Byeglitzki Lightvessel.

**Southern shore—Yeisk Liman.**—From Dolga Point the southern shore of Taganrog Gulf turns to the eastward for 25 miles to Yeisk or Eisk Liman, which is of an oblong form about 13 miles in length from east to west and 6 miles wide from north to south. The entrance, nearly 2 miles wide, is formed between Glafirovka Point and Yeisk Spit, a low narrow strip of sand extending  $4\frac{1}{2}$  miles in a northeasterly direction from Yeisk and which protects the inlet from northerly winds. A tongue of sand, named Naidena Spit, runs off in a southerly direction for 2 miles from Glafirovka Point, and then bends the same distance to the eastward, partly under water. This liman would form an excellent anchorage, but its maximum depth is only about 6 feet with 13 to 9 feet in the entrance.

The village of Old Yeisk stands near the head of the inlet,  $1\frac{1}{2}$  miles to the northward of the mouth of the Yeisk River. The vil-

lages of Nikolævka and Glafirovka are situated on the northern shore of the bay.

A road of some importance leads south from Old Yeisk to Ekaterinodar, on the Kuban.

**Beacons.**—Two black beacons, each 60 feet high and consisting of a mast with a triangular topmark, stand on the extremity of Yeisk Spit. The northern beacon has the triangle point downward and the southern has the triangle point downward.

These beacons in range 183° lead through a channel eastward of Peschani Islands.

**Buoy.**—A black spar buoy, with conical topmark, in a depth of 13 feet, marks the northern extreme of Yeisk Spit.

**Yeisk.**—The town of New Yeisk, or Eisk, was founded by Prince Woronzoff in the year 1848, on the western sandy point of the entrance near the deeper water, and has rapidly increased. The town has now a population of 41,000 people and possesses a cathedral and four churches.

**Harbor.**—On the western side of Yeisk Spit an artificial harbor, dredged to 12 feet, has been constructed. It is formed by two moles extending from the shore in a northwesterly direction for 900 yards, and having an entrance 90 yards wide. A channel 1,400 yards long, 90 feet wide, and having a depth of 13 feet leads up to the harbor entrance and is continued through the harbor to an inner basin, which is 350 yards long and has a depth of 12 feet.

**Yeisk Spit Light**, flashing red, 51 feet above high water, visible 10 miles, is exhibited from a black iron tower with a triangle topmark point pown located on the northeast extremity of the spit.

**Yeisk Light**, fixed red, 45 feet above high water, is exhibited from a mast located on the north side of the basin.

**Piers.**—On the eastern side of Yeisk Spit and northward of the town are two wooden piers used regularly by coasters and by steamers which ply to the various ports in the Azov.

**Communication.**—Steam vessels maintain a daily service with other ports in the gulf during the summer. There is a telegraph station.

**Supplies.**—Fresh meat and other provisions can be obtained in the market.

**Lifeboats.**—There is a life-saving station with two lifeboats and sledges at the harbor.

Another station, with a lifeboat on runners, is situated at Glafirovka, on the eastern side of the entrance to the liman.

**Glafirovka** stands on an elevated point at the northern end of Naidena Spit. One-half a mile south of the village is a two-storied stone house surrounded by storehouses, opposite which is a pier hav-

ing a depth of 5 feet alongside. Small coasting vessels load wheat here.

**Sazalnik Spit.**—From Glafirovka Point the coast trends 6 miles to the northward and then 3 miles to the northeastward to Sazalnik Spit, a low sandy point.

**Sazalnik Village,** situated 2 miles southwestward from the extremity of Sazalnik Spit, may be distinguished by its church, which has five conical cupolas. Near the church are three conspicuous mills; also some brickworks, which resemble a fort.

**Lifeboat.**—A life-saving station, with lifeboat on runners, stands on Sazalnik Pit.

**Sazalnik or Peschani Bank.**—A ridge, with 1 to 4 feet over it, extends  $4\frac{1}{2}$  miles west-northwest from Sazalnik Spit, and an extensive bank of sand, with general depths of from 8 to 12 feet, and many shoaler patches, extends 9 miles farther westward, and has several islets rising from it, about 5 miles from the shore, named Peschani or Sandy Isles, on which are fishing stations.

**Buoys.**—Two black spar buoys, each surmounted by a cone, are moored in a depth of 17 feet  $4\frac{1}{2}$  miles  $313^{\circ}$  from Sazalnik Church.

**Cockerill Shoal,** with 12 feet water, about 13 miles  $281^{\circ}$  from Sazalnik Spit forms the northwest extremity of Peschani Bank; but within the 3-fathom curve the bank extends for more than 1 mile westward and 4 miles northward from this shoal.

Between this shoal and Krivaya Spit, 7 miles to the northwestward, is the fairway channel to Taganrog.

**Channel.**—The beacons on Yeisk Spit, when in range bearing  $183^{\circ}$ , lead between the shoal stretching southeastward from Peschani Islands and that from Sazalnik Spit. This passage, which is marked by spar buoys on either side, has a depth of about 8 feet and is only suitable for small coasters.

**Don River Entrance Lightvessel** exhibits a fixed white and two fixed red lights from a mast 40 feet above high water; black hull, red band near the water line, approximate position  $47^{\circ} 07' 12''$  N.,  $38^{\circ} 59' 30''$  E., anchored near the entrance of the new dredged channel.

**Fogsignal.**—The fogsignal is a bell.

**Buoy.**—About 80 yards east of the lightvessel there is a black spar buoy with cone in 25 feet of water. Vessels must pass north of the lightvessel and this buoy.

**Chimbur Spit.**—From Sazalnik Spit the coast curves  $79^{\circ}$  for  $17\frac{1}{2}$  miles to Chimbur Spit, which lies northeast of two hillocks and the village of Margaritoyka.

**Lifeboat.**—A life-saving station, with lifeboat on runners, is situated at Margaritovka. There is a telegraph station in the village.

**Grecheskaya Bank**, a triangular-shaped shoal, projects about 8 miles in a northwesterly direction from Chimbur Spit, with depths of from 4 to 12 feet. This bank is extending to the northward.

**Lightbuoy**.—A black buoy, surmounted by a topmark and exhibiting an occulting white light, is moored on the north side of Grecheskaya Bank.

**Ochakov Spit**.—Between Chimbur Spit and Ochakov Spit,  $9\frac{1}{2}$  miles  $55^\circ$ , the depth is only 8 feet at 2 miles from the shore, and 8 miles to the eastward of this latter spit is the entrance to the southern branch of the River Don, near the village of Kagalnik.

Two miles westward of Ochakov Spit is the important village of Semli Bakol, which has a conspicuous church.

The bank which prolongs this spit joins that which extends from the mouths of the Don and fills up the eastern part of the gulf.

**Light-and-bell buoy**.—A red bell buoy, with cage superstructure, from which is exhibited an occulting red light, is moored in a depth of 15 feet northward of Chimbur Spit, with Taganrog Lighthouse bearing  $9^\circ$ , distant  $8\frac{3}{4}$  miles. A red spar buoy, with inverted cone, is moored a short distance eastward of it.

These buoys mark the port side of the channel leading to Taganrog and the dredged channel into the River Don.

The lightbuoy is replaced by a red spar buoy when withdrawn for repair or for any other cause. It must not be relied on.

**Byelosarai Spit**.—The northern entrance point of the Gulf of Taganrog is formed by Byelosarai Spit, a low sandy point extending in a southwesterly direction for 7 miles from the village of the same name. Numerous fishing huts are built on this spit.

**Beacon**.—Near the extremity of the spit is a mast beacon, 60 feet in height, with two horizontal battens as a topmark.

**Buoys**.—A red spar buoy, surmounted by an inverted cone, moored in a depth of 26 feet, 2 miles to the southward of the beacon, marks the edge of the bank extending from the extremity of the spit. A similar buoy, also in a depth of 26 feet, situated 2 miles to the north-eastward of the former, marks the southern side of an 18-foot shoal.

**Byelosarai Light**, fixed red, 70 feet above high water, visible 14 miles, is exhibited from a white octagonal stone tower located 1.2 miles  $59^\circ$  from the extremity of the spit.

**Fogsignal**.—The fogsignal is a whistle.

**Lifeboat**.—A life-saving station, with lifeboat on runners, is situated near the lighthouse.

The coast from Byelosarai Lighthouse trends  $35^\circ$  for 10 miles to the town of Mariupol, and is almost straight, the latter part from Byelosarai village being steep and uniform in height. A depth of 14 feet will be found along this coast 1 mile from the shore until within  $2\frac{1}{4}$  miles of the town.



**Mariupol** (lat. 47° 6' N., long. 37° 34' E.) is picturesquely situated on the right bank of the River Kalmius, which enters the sea on the eastern side of the town. The population in the year 1900 was 52,770. There is a hospital to which seamen are admitted.

**Communication.**—There is direct communication by steamship with Hamburg and Antwerp, and daily communication with Azov and Black Sea ports. Mariupol is connected with the Russian railway system. There is telegraphic communication with all parts.

**Coal and supplies.**—A large quantity of Donetz coal, bituminous and anthracite, was in normal times usually in stock. Coaling can be carried out alongside a quay in the port, where there is a depth of 18 feet, from railway trucks by means of hydraulic lifts, or in the roadstead from large lighters.

The total output of the Donetz basin in 1906 amounted to 14,380,280 tons of coal. Provisions of all kinds were plentiful.

**Repairs.**—Only small repairs to machinery can be effected.

**River Kalmius.**—The River Kalmius has a depth of 12 feet for about 2 miles, and there is the same depth in the channel leading to it from seaward. This latter channel is marked on the eastern side by white spar buoys with white flags and on the western side by red spar buoys with red flags.

A wooden training wall extends from the eastern entrance point of the river in a southerly direction for about 550 yards. A bell-buoy is moored about 250 yards to the southeastward of its extremity.

Vessels of 12 feet draft can enter the river where there is a large stone quay on the west bank. Coasters and the steamers plying to the various ports in the sea of Azov make use of this harbor.

**Leading mark.**—The church of a monastery situated in the northern part of the town, which has five high-pointed cupolas in line with the pile driver on the western entrance point of the river, bearing 333°, leads through the channel over the bar.

**Water level.**—After prolonged southerly winds the water in the river mouth will sometimes rise as much as 6 feet above the normal level. This phenomenon is, however, rare.

**Mariupol Light**, fixed red, 32 feet above high water, visible 5 miles, is exhibited from an iron tower located on the head of the south mole at the entrance to the new port of Zintseva.

A fixed green light, 32 feet above high water, visible 5 miles, is exhibited from an iron tower located on the head of the north mole at the entrance to the new port of Zintseva.

**NOTE.**—For other lights see Charts and Light List.

**Lifeboat.**—A life-saving station, with lifeboat on runners, is situated at the river entrance.

**Anchorage.**—Vessels anchor about 2 miles to the southward of the river entrance in from 15 to 16 feet of water, muddy bottom, and good holding ground; but the roadstead is open from southwest through south to east. Nearer the shore there is a depth of 14 feet over a sandy bottom.

**Port of Mariupol.**—Oposite Zintseva Valley, about  $2\frac{1}{4}$  miles to the southwestward of the town and connected with it by railway, is a port consisting of an inner and outer harbor covering an area of 310 acres and approached by a channel  $1\frac{1}{4}$  miles in length. The minimum depth in the channel and in the harbor is  $17\frac{1}{2}$  feet, and this is to be increased by dredging to 21 feet.

Vessels are at present (1907) permitted to load to a draft of 17 feet.

The port is formed by two moles or breakwaters  $\frac{1}{2}$  mile apart, which extend from the shore in a southeasterly direction for about 1,600 yards, leaving a passage 395 feet wide.

Within the harbor, 440 yards from the shore and parallel to it, is a detached breakwater 500 yards in length.

The inner harbor, which is reserved for vessels loading coal, opens into the southern side of the outer harbor and is 1,000 yards long and 400 yards wide.

The port is equipped with two hydraulic elevators for loading coal, one of which can embark in one day the contents of 150 railway trucks.

**Leading beacons.**—Two beacons, 1.3 miles apart, the front one, 49 feet in height, consisting of 2 vertical posts close together surmounted by a circular topmark, and the rear one consisting of an iron trestle, 33 feet in height, with a pentangular topmark, are situated in the valley to the northwestward of the port. The front beacon is painted white and the rear one black.

These beacons, which are lighted at night, when in range  $332^{\circ}$  lead through the dredged channel and into the harbor.

**Pilots.**—There is a service of pilots at Mariupol. Pilotage is not compulsory. It is proposed to make pilotage compulsory for all foreign steamers, and for Russian steamers of over 3,000 tons.

**Depth signals.**—The depth of water in the channel and the dredged portion of the harbor is signaled from a mast on the southern mole head by balls and cones during the day and by fixed red and white lights during the night, each ball or white light representing 1 foot more than 16 feet and each cone or red light 3 inches more. No signal will be made when the depth is less than 16 feet.

**Ice breaker.**—An ice breaker is employed to keep the port open.

**Caution.**—Vessels entering the port must be careful to avoid the anchors of the dredgers.

**Coast.**—From Mariupol the coast trends to the eastward as far as Taganrog, nearly 60 miles.

This coast forms part of the territory of the Don Cossacks, whose villages occupy the valleys between the Kalmius and Mius Rivers.

**Krivaya Spit.**—About 25 miles eastward from Mariupol a flat sandy point extends from the coast in a southerly direction for  $2\frac{1}{2}$  miles, when it turns to the southwestward, forming Krivaya (Crooked) Spit.

The village of Krivaya Kosa, situated on the eastern side of the point, has storehouses for wheat and a wooden pier. The steamers between Taganrog and Mariupol call here.

There is a depth of 12 feet within  $\frac{1}{2}$  mile on the eastern side of the spit; but a bank, with 2 to 6 feet water, extends for nearly 2 miles southwestward from the extremity of the spit.

**Beacon.**—A mast beacon, with supports, 60 feet in height, the topmark consisting of 3 vertical battens, stands near the extremity of Krivaya Spit.

**Buoys.**—Two red spar buoys, with inverted cone topmarks, are moored in 20 feet of water about  $8\frac{1}{2}$  miles to the southwestward of the beacon. A red buoy, with inverted cone topmark, is moored in 14 feet water about 3 miles  $215^{\circ}$  from the beacon.

**Lifeboat.**—A life-saving station, with lifeboat, is situated on the spit.

**Peschani Lightvessel** lies 5 miles southeastward from Krivaya Beacon.

**Peschani Lightvessel** exhibits two fixed white lights, one from each mast, 36 feet above the water, visible 9 miles; straw color, two masts, and a black ball at each masthead; approximate position  $46^{\circ} 59' 45''$  N.,  $38^{\circ} 13' 30''$  E., located near end of Cockrill Shoal.

**Fogsignal.**—The fogsignal is a steam whistle.

**Byeglitzki Spit**, situated 20 miles eastward from Krivaya Spit, extends 2 miles to the southeastward from a point near the village of Varvatzi. Between Krivaya and Byeglitzki Spits the coast runs back, forming a bay about 3 miles deep, near the head of which is the village of Veselo Voznesensk, recognizable from seaward by its church and by a large stone windmill on the hillside. Four miles westward of the extremity of Byeglitzki Spit is the wide valley of the Mius River, the entrance to which is narrowed by two sandy spits having a shallow channel between them.

**Zolotaya (Golden) Bank**, with 3 to 5 feet water over the greater part of it, extends southwestward and southeastward from Byeglitzki Spit for a distance of 5 miles, where a depth of about 12 feet will be found. To the westward it joins the bank which fronts the shore

between Krivaya and Byeglitzki Spits; to the eastward it is connected with Petrushina Bank.

**Lifeboat.**—There is a life-saving station on Byeglitzki Spit, and a lifeboat on runners is stationed at Zololaya Spit, 3 miles farther eastward.

**Byeglitzki (Golden Bank) Lightvessel** exhibits two fixed red lights 59 feet above the water, visible 13 miles; red hull, three masts, and name in black on white band on sides; approximate position  $47^{\circ} 01' 15''$  N.,  $88^{\circ} 34' 37''$  E., north side of channel, 6.5 miles  $175^{\circ}$  from Byeglitzki Spit.

**Fogsignal.**—The fogsignal is a siren.

**Petrushina Point** lies 12 miles  $80^{\circ}$  from Byeglitzki Spit, the intervening coast being steep and above 60 feet in height. Four miles northeastward of this point is the town of Taganrog, the coast between forming a small bay.

**Petrushina Bank**, with depths of 4 to 9 feet, extends nearly 6 miles to the southward of Petrushina Point.

**Lightbuoys.**—Southward of Petrushina Bank, and marking the channel to Taganrog, are two lightbuoys.

**Cherepakha (Tortoise Island).**—About  $1\frac{1}{2}$  miles  $159^{\circ}$  of Taganrog is the low sandy island of Cherepakha, on which stands a red framework light beacon, 14 feet in height. Near the island there is a depth of 9 feet, with 12 and 14 feet to the westward.

**Taganrog Road** occupies the eastern part of the gulf from a line joining Chimbur and Zolotaya spits to the mouths of the Don.

**Anchorage.**—Vessels of the deepest draft that can enter the Sea of Azov anchor about 25 miles from Taganrog, to the southwestward of Byeglitzki Lightvessel. Other vessels anchor nearer the town, according to their draft, in from 14 to 18 feet of water. Foreign vessels anchor to the southward of Byeglitzki Lightvessel, within an area marked by spar buoys carrying green flags with a white St. Andrew's Cross. The customs steamer is usually anchored in the center of this space.

Communication is carried on by steam barges, tugs, and lighters.

The bottom in the road, in depths of more than 12 feet, consists of soft mud; between 9 and 12 feet it consists of sand and mud, or of sand only.

After several days in the anchorage it is sometimes difficult to weigh the anchor, even when anchored where the bottom is hard.

**Caution—Water level.**—Vessels should take precautions against swinging over their anchors on account of the variation in the level of the water caused by the winds.

On account of these changes of level it is impossible to show on the chart the true depths, those given being the mean level obtained by

observation. Southerly and westerly winds increase the depth, and northerly and easterly winds diminish it by 2 to 3 feet.

Occasionally, after a strong wind, the head of the gulf dries for a distance of 5 miles from the mouths of the Don; and in the neighborhood of Taganrog the bay north of the town becomes nearly dry, and southward of the town it is sometimes possible to walk on dry land from the shore to the Island of Cherepakha. When this occurs the depths in the gulf are diminished by 7 feet or more.

**Ballast ground.**—Four black spar buoys, with black flags, are placed in 16 feet of water, southward of Byeglitzki Lightvessel, to mark the northern limit of the space appointed for discharging ballast. Vessels carrying water ballast, after passing through the usual customs formalities at Kertch, have an official placed on board, who proceeds with the ship to Taganrog Road. On arrival a flag is hoisted, acquainting the customs authorities that the vessel has water ballast, when lighters and coasting vessels are permitted to proceed alongside at once and commence discharging their cargoes. Severe regulations exist respecting throwing stones overboard. These are required to be landed under penalty of a fine, but this regulation is seldom attended to, and the roadstead is thereby severely injured. Most of the vessels, however, which enter the port carry water ballast.

**Quarantine.**—All quarantine formalities are carried out at Kertch.

**Taganrog Light,** fixed white, with red and green sectors, 161 feet above high water, visible 19 miles, is exhibited from a white cylindrical iron tower located on the elevated shore in the town.

**Fogsignal.**—The fogsignal is a bell.

**Light.**—A flashing red light, 15 feet above high water, visible 7 miles, is exhibited from a red iron framework tower located on Cherepakha Island south of Taganrog.

**Port Taganrog.**—The harbor, which lies at the southern point of the bay, is formed by two curved moles, 600 yards apart, with an opening 140 yards wide between their outer extremities. An inner mole, 200 yards in length, separates it from Petrovski Basin, and a third basin is under construction to the southwestward of the latter. The depth in the harbor is 12 feet.

On the northeastern side of the town is a quay with depths of from 2 to 8 feet.

**Dredged channels.**—A dredged channel, about 1 mile in length, 90 yards in width, and with a depth of 12 feet at mean water level, leads up to the harbor. It is marked on its western side by red spar buoys and on its eastern side by black spar buoys.

A dredged channel, about  $2\frac{1}{2}$  miles in length, 47 yards in width, and with a depth of about 9 feet at mean water level, leads from

the north mole of the harbor to some metal works northward of the town. It is marked by buoys in a similar manner to the other channel.

**Beacons.**—Three beacons, painted spirally white and black, the front one carrying a circular disk and the others a square black top-mark, situated on the northern side of the harbor, in range, bearing  $355^{\circ}$ , lead through the dredged channel to the harbor entrance.

Two beacons, the front one painted green and the rear one white, situated at the metal works, when in line bearing N.  $22^{\circ}$  W., lead through the dredged channel.

**Lights.**—A fixed red light, 19 feet above high water, visible 5 miles, is exhibited from a red post located on the head of the south mole of the basin port side of entrance.

**Fogsignal.**—The fogsignal is a bell.

**Range lights.**—Two fixed white lights, shown from the head of the north mole of the basin and two fixed white lights located 116 yards  $355^{\circ}$  from the front lights when in range, lead through the channel from Cherepakha Island to the New Basin.

NOTE.—For other harbor lights see Light List.

**Pilots.**—Pilotage is not compulsory. Pilots can be obtained at Kertch.

**Taganrog**, situated on the southern point of the bay of the same name, is one of the most important ports in Russia. It has large and numerous warehouses and many very handsome private dwellings. The town suffers from occasional violent dust storms, and the sanitary condition is not good, there being no system of drainage and no water supply except from wells and cisterns. There is a private hospital for seamen, but infectious cases are not admitted. The population in 1905 amounted to 66,100.

The surrounding country is fertile and produces excellent fruits and culinary vegetables. The vine and mulberry flourish, but the country is destitute of wood.

**Communication.**—There is railway communication with Khar'kov, Rostov, and the general Russian system.

Taganrog has regular communication by steamers with other ports in the Sea of Azov and the Black Sea; also telegraphic communication with all parts.

**Depth signals.**—The depth of water in the dredged channel is indicated from a flagstaff on the south mole by the following signals:

By DAY, the signals are made by means of balls, each large ball indicating 1 foot and each small ball 3 inches.

By NIGHT, the signals are made by means of white and red lights, thus:—

One white light indicates a depth of 5 feet.

One white and one red light,  $5\frac{1}{2}$  feet.

Two white lights, 6 feet.

Two white lights and one red light,  $6\frac{1}{2}$  feet.

Three white lights, 7 feet.

Three white lights and one red light,  $7\frac{1}{2}$  feet.

Four white lights, 8 feet.

Four white lights and one red light,  $8\frac{1}{2}$  feet.

Five white lights, 9 feet.

Five white lights and one red light,  $9\frac{1}{2}$  feet.

Six white lights, 10 feet.

Depths above 10 feet are not shown.

A red triangular flag is hoisted when the water is falling and a white triangular flag when the water is rising.

**Storm signals** are shown from a signal staff near the lighthouse, and repeated by the customs steamer anchored in the outer road near the Byeglitzki Lightvessel.

**Lifeboat.**—There is a life-saving station, with lifeboat, on the south side of the harbor.

**Ice breaker.**—A small ice breaker is employed, but it is impossible to keep the gulf and harbor open during a hard frost.

**Coal and supplies.**—In normal times a small quantity of native coal, of fairly good quality was kept in stock; and the collieries being in the immediate vicinity any quantity could be obtained by giving a short notice. Small vessels can coal alongside a quay where there is a depth of 12 feet. Vessels of heavy draft must coal in the roadstead, the coal being carried in lighters a distance of from 25 to 30 miles, and with the least swell they could not remain alongside. Vessels, however, rarely coal at Taganrog as they can get better facilities and lower prices at other ports.

Supplies of all kinds could be obtained, but no repairs to machinery effected, except at Rostov-on-Don. There is a slip in the harbor which will take small steamers.

The water alongside will be found potable if the sediment be allowed to settle before it is used.

**Taganrog Bay.**—From Taganrog the coast trends to the northward for 4 miles and then to the eastward for 3 miles to Kurichi Rozhok (Armenia Point), forming Taganrog Bay in which there is only a depth of from 4 to 7 feet. The Sambek River flows into the northern part of the bay.

From Armenia Point the coast runs in an easterly direction for 8 miles, when it turns to the southward and is broken up into numerous low islands, between which the waters of the Don River flow into the gulf.

**River Don.**—The Don River empties into the head of the Gulf of Taganrog by several mouths, which extend from the village of Sin-yavka on the north to as far as Kagalnik, 12 miles to the southward.

It overflows its banks in May but returns to its usual limits at the end of June or beginning of July.

This noble river, which flows from Lake Ivan, in the Government of Tula, runs southeastward to within 40 miles of the Volga, when it turns abruptly to the southwest for 240 miles and empties into the head of the Gulf of Taganrog, its whole course being about 900 miles.

**Entrances.**—Of the several mouths of the river the two principal are the Egurcha Mouth, 5 miles southward of Sinyavka, and the Merinovoe, about 5 miles farther south. The former is the channel used by vessels proceeding to Rostov; the latter is only used by trains of timber rafts.

**Depths.**—A channel  $9\frac{1}{2}$  miles long, with a least depth of 14 feet, has been dredged through the bank at the head of the gulf and up to the Egurcha Mouth, and not less than the same depth can be maintained as far as Rostov, about 25 miles.

**Water level.**—A continuance of strong northeasterly winds will reduce the depths in the delta of the Don by as much as 5 feet.

**Dredged channel—Buoys and lights.**—The dredged channel leading into the Egurcha Mouth consists of three reaches, marked by black spar buoys on the starboard hand (south side) and by red spar buoys on the port hand, surmounted by brooms, in accordance with the Russian system, those in the first or sea reach being lighted at night with white lights on the starboard hand and red lights on the port hand. The bends and other points are also indicated by conical buoys, of the same color as the spar buoys. At night the first bend is marked by two vertical white lights on the south side, and the second bend by two vertical red lights on the north side.

**Range lights.**—Lights are exhibited from openwork iron towers located on the artificial islands northeastward of the northern end of the first reach of the dredged channel.

These lights in range bearing  $58^{\circ}$  lead through the first reach of the dredged channel.

**Depth signals.**—The following signals, to indicate the depth of water in the dredged channel, are made from the lightvessel, and from the signal mast at the Pereboini pilot station.

**BY DAY—**

Each red ball at the upper yardarm indicates a depth of 5 feet.

Each large black ball (3 feet) at the lower yardarm denotes 1 foot.

Each small black ball (14 inches) at the lower yardarm denotes 3 inches.

**BY NIGHT—**

Each red light in the upper yardarm indicates 5 feet.



Each white light on the lower yardarm indicates 1 foot.

Parts of a foot are not indicated by night.

There are also tide gauges on either side of the first reach of the channel.

Vessels are not permitted to use the channel unless their draft is at least 6 inches less than the depth shown by signal or by the gauges.

**Storm signals** are shown at the pilot station on Pereboini Island and from the lightvessel.

**Lifeboat.**—The lightvessel is equipped with a lifeboat.

**Tugs** can be obtained to take vessels up to Rostov.

**Pilots** can be obtained from Rostov. Pilotage is compulsory in the river.

**Ice breakers.**—Two ice breakers are employed to keep the dredged entrance channel and river open, so far as possible, during the winter.

**Azov.**—The ancient town of Azov, reduced at the present day to a village, stands on the southern bank of the Don River, 6 miles above the Merinovoe Mouth. It has a telegraph station.

**Rostov-on-Don** is picturesquely situated on the elevated right bank of the Don, 25 miles above the Egurtcha Entrance. It is the largest commercial town on the Sea of Azov and one of the most important on the south coast of Russia. In 1906 the population amounted to 135,261, and that of the adjacent town of Nakhichevan was 36,077. It is the principal terminus of three great railways and the depot for all the produce of the rich territory between the Don and the Caucasus Mountains.

Vessels berth at Rostov alongside the wharf, where there is usually a depth of 18 feet.

River steamers of light draft can navigate to Kalatch, about 335 miles above Rostov.

**Communication.**—There is railway communication with Moscow; also with Taganrog and the general Russian system. To the southward there is communication with Novorossisk, on the Black Sea, and with Petrovsk and Baku, on the Caspian.

The Russian Steam Navigation Co. and the Volga-Don Steamship Co. maintain a regular service with Black Sea and Azov ports. There is telegraphic communication with all parts.

**Patent slips.**—There are three patent slips, the largest of which is capable of hauling up a vessel of 700 tons. The Volga-Don repairing works, opposite Nakhichevan, undertake repairs to hull and machinery.

**Coal and supplies.**—In normal times about 4,500 tons of bituminous and anthracite coal are usually in stock. It is brought off

in lighters and steam barges. Fresh meat, vegetables, and bread can be obtained.

**Directions for the Gulf of Taganrog.**—The best course to be steered by vessels after clearing Kertch Strait, if bound for the Gulf of Taganrog, is  $10^{\circ}$  for about 70 miles, from which position Berdiansk Point Light should be in sight, bearing about  $281^{\circ}$ . On this course the water will gradually deepen from 5 to 7 fathoms 43 miles from the strait, but commences to shoal beyond that distance. For an extent of 60 miles from the strait the bottom will be of mud, but to the northward it will be mixed with sand. Eastward of this track the water becomes shallower, and on approaching the shore the bottom is composed of reddish shells, but westward of the track the water is deeper and the bottom mud.

With Berdiansk Point Light bearing  $281^{\circ}$  9 miles, course may be altered to  $45^{\circ}$ , to pass about 4 miles southward of Byelosarai Lighthouse, and when it bears  $315^{\circ}$  distant about 4 miles, course should be altered to  $67^{\circ}$  and the dotted track shown on chart followed, which will lead through Mariupol Basin southward of Krivaya Spit Beacon and northward of Peschani Lightvessel (moored off Peschani or Szalnik Spit). On this course the depths will be from 30 feet off Byelosarai Spit to about 20 feet when nearing the lightvessel.

From Peschani Lightvessel course may be shaped to pass about 1 mile southward of Byeglitzki Lightvessel, the average depth between them being about 20 feet. Vessels of heavy draft anchor in the outer roadstead, about midway between the lightvessels. Those of light draft continue on for Byeglitzki Lightvessel, leaving her on the port hand, and steer to the northeastward, passing northward of the black lightbuoy at the extremity of Grecheskaya Bank, when the depth will have decreased to 16 feet; thence southward of the red light-and-bell buoy off Petrushina Bank, when vessels bound for the port of Taganrog should steer  $11^{\circ}$  for the entrance to the dredged channel.

**At night,** vessels when about 3 miles eastward of Byeglitzki Lightvessel should steer to the northeastward for about 6 miles, keeping in the sector of white light shown from Taganrog Lighthouse until abreast the lightbuoy, near the extremity of Grecheskaya Bank, in 18 feet water. They must then enter the first sector of green light, steering to the eastward until past the light-and-bell buoy southward of Petrushina Bank. The second sector of white light will be entered, when the course may be shaped toward Taganrog and anchorage taken up as convenient, the water shoaling gradually.

**Return voyage.**—On the return voyage southward toward Kertch Strait it will be prudent in unsettled weather to steer a little westerly to avoid the risk of being embayed on the low eastern shore with northwest winds, which are very prevalent in this sea. On

nearing the strait three hills will be recognized, two of which are 6 miles west-northwest of Cape Fanar, the third being the cape itself, which, seen from a distance, appears separated from the rest of the coast.

**Coast.**—The western shore of Byelosarai Spit trends to the northward and northwestward for 5 miles to the village of Yalta, which stands in a ravine and is easily distinguished from seaward by its church and windmills. From Yalta the coast, which is steep and bordered by cliffs of a reddish color, trends for 18 miles in a  $213^{\circ}$  direction to the Berda River, the entrance to which is barred by a sand bank. On the northeastern shore of the river stands the fortress and village of Petrovskoi. A church in the village, with five cupolas and surrounded by white buildings, is conspicuous from seaward.

Ursuf or Zelenoe village lies 7 miles southwestward of Yalta and is visible from seaward.

The water is shoal to the westward of Byelosarai Spit, and 2 miles from its extremity a depth of only 16 feet will be found.

**Vesuvius Rocks**, two in number, with depths of 3 and 9 feet over them, respectively, lie 8 miles to the southwestward of Yalta; the outer, with 9 feet, is nearly 2 miles from the shore.

**Anchorage.**—Small vessels can find shelter from easterly and northeasterly winds in the southern part of the bay, between Byelosarai Spit and Yalta, in a depth of about 18 feet, at  $2\frac{1}{2}$  miles to the westward of Byelosarai Lighthouse.

Anchorage will also be found, in a depth of about 22 feet, off Berda River, with the fortress bearing northwest.

**Berdiansk Point.**—From the Berda River the extensive sand spit of Berdiansk extends in a  $213^{\circ}$  direction for 12 miles, terminating in Berdiansk Point, the southern portion of which is about 5 miles in length and in some places only 200 yards wide. It is often submerged in the spring and after fresh winds from east to south-southeast.

**Shoal.**—A shoal with 13 feet water lies with Berdiansk Point Lighthouse bearing  $261^{\circ}$ , 3 miles.

**Buoys.**—Two red spar buoys, with inverted cone topmarks, in 29 feet of water, and 2 similar buoys, in 25 feet of water, situated, respectively,  $168^{\circ}$  and  $213^{\circ}$ ,  $1\frac{1}{2}$  miles from Berdiansk Point Lighthouse, mark the extremity of the shoal water extending from the point.

**Light.**—A flashing white light, 78 feet above high water, visible 14 miles, is exhibited from a white octagonal tower with a red horizontal band located 600 yards from the extremity of the spit.

**Fogsignal.**—The fogsignal is a horn.

**Life-saving station.**—There is a life-saving station, with lifeboat, on the point near the lighthouse.

**Berdiansk Road.**—Between Berdiansk Point and the coast to the northwestward is a bay 10 miles wide, at the head of which is the town

of Berdiansk. This bay affords anchorage in depths of from 15 to 21 feet, bottom of soft mud with shells, or sand and mud.

This roadstead is open earlier and later in the season than that of Taganrog, and is sheltered from northwest to northeast. Winds from these quarters will lower the level of the water by as much as  $1\frac{1}{4}$  feet.

**Berdiansk Light**, two fixed white, 165 feet above high water, visible 19 miles; is exhibited from a white square tower on the keeper's dwelling located at the northwest extremity of the town.

**Ballast ground**.—Two red buoys in the northwestern part of the bay mark the southern limit of the ballast or spoil ground.

A beacon, situated near the shore,  $226^{\circ}$  from the upper lighthouse, when in range with it on that bearing, also indicates this limit.

**Wreck**.—A wreck, with a depth of 11 feet over it, is situated in the roadstead, with upper Berdiansk Light bearing  $33^{\circ}$ , 2 miles. It is marked by a black and white checkered buoy.

**Directions**.—Vessels of more than 10 feet draft should pass about 2 miles westward of lower Berdiansk Light and steer in for upper Berdiansk Lighthouse on a  $33^{\circ}$  bearing. At night the upper Berdiansk lights will be in sight between the bearings of  $16^{\circ}$  and  $46^{\circ}$ .

**Berdiansk**.—This town, which, in the year 1900, had 29,100 inhabitants, stands on the western part of the sandy spit, 7 miles  $11^{\circ}$  Berdiansk Lighthouse and at a short distance from the bold tableland which backs it. The town is regularly built, with wide, straight streets, and is surrounded by gardens. The Kutse Berdianka River, which is dry in summer, flows into the sea 4 miles to the westward of the town.

**Communication**.—Steamers maintain an almost daily service in the summer with other ports of the Sea of Azov and Kertch and with Theodosia three times weekly. Railway communication with all parts of Europe, also telegraphic communication.

**Harbor**.—A breakwater, 700 yards in length and about  $\frac{1}{2}$  mile from the coast line in front of the town, affords shelter from the southward and westward. A port is under construction within this breakwater, the western mole of which is completed. The depth in the port is 17 feet, which is being increased by dredging to 20 feet.

**Dredged channel**.—A channel  $1\frac{1}{2}$  miles long, 280 feet broad, and with a depth of 17 feet has been dredged in a  $39^{\circ}$  direction up to the western end of the breakwater. Vessels drawing  $16\frac{1}{2}$  feet are allowed to use this channel. Dredging is in progress to increase the depth to 19 feet.

The southeastern side of the channel is marked by black spar buoys with upright cone topmarks, and the northwestern side by red spar buoys with inverted cones.

**Beacons.**—Three mast beacons, each 39 feet in height, have been erected on the shore, which when in range, 39°, lead through the channel.

The front beacon, on the shore, is black and has a triangular topmark; the second, on the slope of the hill, 1,280 yards from the first, is white and has a rectangular topmark; the third, on the hill, 70 yards from the second, is red and has a disk for a topmark. It is intended to place lights on the first and third beacons.

**Regulations.**—Steam vessels must pass by the steam dredger at a very slow speed in order that the wash may not hinder the progress of the work.

In positions indicated by a red flag or lantern vessels must stop their engines in good time and not start them again until these positions are passed.

**Harbor lights.**—A fixed green light, 31 feet above high water, visible 3 miles, is exhibited from an iron post located on the northwest end of the breakwater.

A fixed red light, 31 feet above high water, visible 3 miles, is exhibited from an iron post located on the southeast end of the breakwater.

An alternating white and red light, 31 feet above high water, is exhibited from a yellow cabin on wooden supports located on the extremity of the west mole.

**Range lights.**—A fixed red light, 38 feet above high water, is exhibited from a black triangular beacon located on the beach in front of the town.

A fixed white light, 158 feet above high water, is exhibited from a red beacon located 1,350 yards 40° from the front light.

These lights in range indicate the channel into the harbor.

**Coal and supplies.**—Coal in normal times was not kept in stock for supplying shipping. It can be obtained by rail as required. Vessels coal at the wharf, where there is at present a depth of 16 feet. Supplies of all kinds can be purchased. Water is not good and is expensive.

**Repairs to machinery** can be effected.

**The coast** from Berdiansk is bold and cliffy and trends to the westward and southwestward for 19 miles, when another low sandy projection, known as Obitochna Spit, extends in a southwesterly direction for a farther distance of 14 miles.

At the northern end of Obitochna Spit is a rounded point above which, on higher land, are six hillocks, which form a good landmark and can be seen 13 miles.

**Beacon.**—A black beacon, surmounted by a triangle, base upward, stands near the southwest extremity of Obitochna Spit, with Berdiansk Point Light bearing  $78^{\circ}$ , 28 miles. The beacon is elevated 58 feet above the sea and should be visible in clear weather about 9 miles.

**Obitochna Banks.**—A bank, with irregular depths of from 18 to 31 feet, will be found all along the eastern side of the spit, extending 8 miles southeast from its northern end to nearly 20 miles east-southeast from its southern end, on which two patches of 18 and 19 feet lie, respectively,  $13\frac{1}{2}$  miles  $78^{\circ}$  and the same distance  $112^{\circ}$  from the spit beacon, with from 22 feet to 30 feet between them.

A bank, with depths of from 10 to 17 feet, extends  $6\frac{1}{2}$  miles southeastward from the beacon.

These banks are called the Obitochna Banks.

**Buoys.**—A red conical buoy is moored, in a depth of 25 feet,  $7\frac{1}{2}$  miles,  $140^{\circ}$  from the beacons, to mark the southeastern extremity of the latter of the two banks mentioned above. A red spar buoy, with inverted topmark, is moored close to the conical buoy.

**Shoal.**—On the western side of the spit, distant 12 miles west from the spit beacon, is a shoal patch of 16 feet, having 27 and 28 feet around it. It is situated about 7 miles from the nearest shore.

**Anchorage.**—The bay to the northward of the spit affords good shelter from easterly and northeasterly winds.

The Solenaya River flows through a ravine into the head of this bay. A depth of 19 feet will be found at 5 miles southwest of the river.

**The coast** from the mouth of the Solenaya River trends west and southwestward for 40 miles to Kirilovka Point, on which stand some houses and windmills. The point is preceded by a sandy shore to the eastward, about 6 miles in length, which separates from the sea Molosh Lake, into which the little river Molosh flows.

On the rising ground at the northeast end of the sandy shore is the village of Stepanovka, having a solitary windmill. Ten miles northeastward of the village is a remarkable hillock, surrounded by a column.

**Bank.**—About  $3\frac{1}{2}$  miles  $123^{\circ}$  of Kirilovka lies the center of a bank of 16 feet, which extends in a  $33^{\circ}$  and  $213^{\circ}$  direction 4 miles.

**Beriuch Peninsula (Fedotova) Spit.**—The Beriuch Peninsula extends from Kirilovka Point,  $12\frac{1}{2}$  miles  $213^{\circ}$ , preserving the breadth of about  $\frac{1}{4}$  mile. It then increases in breadth, and forms Fedotova Spit, which trends southwestward for 11 miles to Beriuch Spit, its

southwestern extremity; then northeastward 4 miles to Stagshorn Point, where it is  $3\frac{1}{2}$  miles wide. A small piece of table-land on which is a farm with some large sheds, and which appears to have been detached from the coast, intercepts the peninsula 4 miles from Kirilovka Point.

**Beriuch Spit Light**, fixed white, 85 feet above high water, visible 15 miles, is exhibited from a white circular tower located near the southwestern extremity of the spit.

**Beacon**.—A black mast beacon, with supports, 57 feet in height, surmounted by a ball, is situated  $10\frac{1}{2}$  miles northeastward of Beriuch Spit Lighthouse, and serves to mark the low peninsula.

**Banks**.—A depth of 18 feet will be found along the eastern side of Beriuch Peninsula,  $\frac{3}{4}$  mile from the shore, and 4 miles from it a bank with a least depth of 20 feet extends the whole length of and parallel to the peninsula.

Westward of Beriuch Spit, the eastern point of entrance to Ghenichesk Gulf, shoal water extends for 3 miles from the lighthouse. Near the extremity of the spit there are depths of 16 to 18 feet, but  $2\frac{1}{2}$  miles  $281^\circ$  from the lighthouse there is only a depth of 11 feet, from which position the bank turns north-northeastward, parallel to the spit, the depth northwestward of Stagshorn Point being 18 feet  $1\frac{1}{4}$  miles from it. Thence the bank trends eastward with the shore.

**Buoy**.—A red spar buoy, with inverted cone topmark, moored in a depth of  $2\frac{1}{4}$  feet, marks the western extremity of the bank, extending from Beriuch Spit.

**Gulf of Ghenichesk**.—This gulf, the upper part of which is known as Utlyuk Liman, lies between Beriuch Peninsula and the table-land which terminates at Ghenichesk. It is about 30 miles in length in a northeasterly direction, with a greatest breadth of about 7 miles.

The entrance, which is about 6 miles wide, but contracted to 3 miles by the bank extending westward from Beriuch Spit, has a navigable depth of 22 feet. Thence the depth gradually decreases to 15 feet westward of Kirilovka, 20 miles, from which position the water gradually shoals to the head of the inlet.

On the western shore, abreast Stagshorn Point, is the town of Ghenichesk. Northeastward of the latter are the villages of Derevnia and Boskuia.

**Shoals in approach**.—The western side of the approach to Ghenichesk Gulf is formed by the Tonka and Arabat, off which the soundings are very uneven patches, with 18 feet water, 12 and 18 miles from the shore, 19 and 33 miles, respectively, southeastward from Beriuch Spit Lighthouse.

A shoal, with a depth of 18 feet over it, is stated to exist about 11 miles  $126^{\circ}$  from Beriuch Spit Lighthouse; and  $1\frac{1}{4}$  miles  $348^{\circ}$  from this shoal is another shoal, with 16 feet of water.

A bank with a depth of 20 feet over it lies southeastward of the last-mentioned shoals and  $17\frac{1}{2}$  miles  $126^{\circ}$  from the lighthouse.

**Buoy.**—A black buoy, surmounted by a cone, is moored in a depth of 24 feet on the northwestern side of the 20-foot bank.

**Light.**—Two fixed red lights, 81 feet above high water, visible 15 miles, are exhibited from a white quadrangular stone tower located on the west shore of the bay north of the town.

**Directions.**—When entering the gulf for Ghenichesk Roadstead the lighthouse at Ghenichesk kept on a N.W. by N.  $\frac{1}{4}$  N. bearing, or at night the red lights in sight leads clear of all dangers.

**Roadstead.**—There is a very good roadstead, where vessels load from lighters, between Ghenichesk and Beriuch Spit, in 18 to 21 feet water, over a muddy bottom, at about midway between the two shores, and open only to south-southeastward.

The western shore of the roadstead abreast of Beriuch Spit has a depth of 21 feet  $\frac{1}{2}$  mile from the shore; abreast and northeastward of Ghenichesk the depth is only 18 feet 2 miles from it.

**Pilots.**—Pilotage is not compulsory. Pilots can be obtained at Kertch if required.

**Ghenichesk Strait.**—The entrance to the Putrid Sea through Ghenichesk Strait, which lies within Ghenichesk Gulf entrance,  $8\frac{1}{2}$  miles northwestward from Beriuch Spit Lighthouse, is formed between the southern bold table-land which borders the northern shore of this sea and the northern extremity of the Tonka. It is about 150 yards broad and deepened to 10, 12, and 15 feet by the current to which it gives a passage, and the channel over the bar at its entrance has been dredged to a depth of 12 feet. A railway bridge crosses the strait near its western end.

The entrance channel requires redredging (1907). It is proposed to dredge it to a depth of 21 feet.

**Currents.**—The currents in the strait, which are caused by the winds blowing from the Sea of Azov or from the Putrid Sea, attain a velocity of  $3\frac{1}{2}$  knots, at times 5 knots. Currents, due to the same cause, but of less strength, are also felt in the road.

**Water level.**—The usual variation in the water level in the strait and roadstead, due to the wind, does not exceed 1 foot. The maximum fall of the water is as much as 3 feet, and the maximum rise during easterly gales reaches 4 feet.

**Buoys.**—The channel over the bar of Ghenichesk Strait is marked by black buoys on the starboard hand and by red buoys on the port hand, entering, and by a red spar buoy with a ball, at the entrance.



**Range lights.**—A fixed green light, 34 feet above high water, is exhibited from a gray pillar and hut located on the northern extremity of Arabatsk Point.

A fixed red light, 58 feet above high water, is exhibited from a gray pillar and hut located 260° from the front light.

A red iron buoy, exhibiting a flashing white light, is moored 2,520 yards 83° from the front light.

These lights in range give the direction of the channel.

**Ghenichesk.**—The town of Ghenichesk, which contains a population of about 7,000, is situated on the northern shore of the strait. The church is conspicuous from seaward. There is a hospital in the town to which seamen are admitted.

On the southern side of the town is a pier, connected with the railway, at which barges of 8 to 10 feet draught load or discharge cargo.

Four white lights, visible 7 miles, are lighted in the port when cargo is being worked.

**Communication.**—Ghenichesk is connected with the Russian railway system. There is communication with Kertch during the summer, once or twice weekly, by the vessels of the Volga-Don Steamship Co., and telegraphic communication with all parts.

**Supplies.**—Water of good quality can be obtained at the piers. Provisions can always be obtained. Coal is not kept in stock for supplying shipping.

**The Sivash or Putrid Sea** is divided into two irregular gulfs or branches, one of which runs westward to the isthmus of Perekop, and the other extends southeastward toward Theodosia (Kaffa) Bay, receiving the waters of several rivulets from the Crimea. The whole of this part is very shallow, even for boats.

**Coast.**—The **Tonka** (narrow) or **Strelka** (arrow) of Arabat is the western boundary of the Sea of Azov, separating it from the Sivash. It is a very low and narrow sand strip, 60 miles in length, slightly curving south-southeastward from Ghenichesk to Arabat Fort. The shore on its eastern side is higher than that on the western, from the quantity of sand that has been washed up by the sea almost on an even line. On the other side, however, it is very uneven, and formed of vegetable earth. Its breadth is irregular, the narrowest part being  $\frac{1}{2}$  mile across. A post road runs along it, and there are several wells of fresh water.

**Bank.**—About 22 miles north-northwest of Arabat a bank has formed with a depth of 9 feet, 4 miles from the shore, and 14 feet, 5 miles; but between it and Ghenichesk Strait, a depth of 18 feet will be found 1 to  $1\frac{1}{2}$  miles from the coast, over a bottom of sand and shells.

**Beacon.**—A black mast beacon, with supports and triangular top-mark, 60 feet in height, is erected on the Tonka, abreast the 9-foot bank, from which the outer extremity bears  $56^{\circ}$  5 miles.

**Arabat Bay and Fort.**—The ancient fortress of Arabat stands near the southern extremity of the Tonka, at the bottom of Arabat Bay. Vessels visit this bay to load salt. The bay is much exposed from northwest to northeast. Winds from the north and northeast send in much sea, which prevents all communication with the shore.

Two miles eastward of the fort, on high ground, is the large Tartar village of Akhmanai. Good water can be obtained from the wells situated about 200 yards from the shore.

**Anchorage.**—The depths in the bay diminish very gradually toward the shore. The best anchorage is in 25 feet, bottom mud and shells, about  $2\frac{1}{2}$  miles northward of the village. Near the shore the bottom is sandy.

**Coast.**—The sandy coast terminates at Arabat, bending round east-northeast for 13 miles to Kiten Point. It then trends  $33^{\circ}$  for 7 miles to Kazantip Point, which forms the northern extremity of a peninsula projecting into the sea from the Crimea.

**Kazantip Anchorage.**—Kazantip Point is rocky, of moderate height, bold to approach, and its eastern extremity affords shelter against north and northwest winds, in from 15 to 20 feet water, over a muddy bottom; but the Wrangler Patch of 10 feet, lying  $146^{\circ}$  1 mile from the east point, must be avoided.

When approaching this anchorage, the summits on Kazantip Point, being separated from the shore to the southward by a low sandy neck, appear as two islands and form a good mark for recognizing the bay.

**Chagani Point**, recognizable by the numerous summits on it, two of which are higher than the others, bears  $101^{\circ}$  9 miles from Kazantip Point, and between them the coast falls back 5 miles to the southward, forming a deep bay, known as Kazantip Bay, carrying a depth of 25 feet, over a muddy bottom, 1 mile from the shore. It is bordered by a beach and exposed to northwest and northeast winds.

There is anchorage in the southeastern part of the bay, in a depth of 30 feet, off the village of Adjubai.

From Chagani Point the coast trends to the eastward, and as far as Kertch Strait is backed by hills.

**Bagatubi Point**, nearly 9 miles eastward of Chagani, is high, and near it is the salt lake named Chokrak. From thence the coast bends to southeastward, and about 2 miles farther on is Ziuk Point, a small elevation, steep and rocky on its seaward side and sloping gently toward the shore, connected to the mainland by a strip of sand.

**Banks.**—Between Chagani and Bagatubi Points a bank of gravel fronts the coast for about 7 miles, extending, in its broadest part, about 2 miles from the shore, where there is a depth of 10 feet; and

from Ziuk Point, a bank curves to the northwest for 3 miles, with a depth of 15 feet on it, but there is a depth of 308 feet between it and the bank off Bagatubi Point.

The outer edge of this bank is steep, the depth decreasing suddenly from 30 feet to 12 feet.

**Tarkan Point** lies  $4\frac{1}{2}$  miles  $101^{\circ}$  from Ziuk Point, the bay between them being filled by a bank, with from 8 to 12 feet of water, which extends 1 mile from the shore. The village of Great Tarkan is situated in a bight on the western side of the point.

**Cape Khroni (Julia)** lies 6 miles  $101^{\circ}$  from Tarkan Point, and between them the coast recedes a little to the southward, forming a bay, in which a depth of from 28 to 30 feet will be found 1 mile from the shore. The cape slopes down from a high steep coast and is covered with large gray rocks which render it easily distinguishable when seen from the northward. Inland, above the cape, will be seen Mounts Khronia and Temir Oba. The first forms a long ridge with a cleft summit on its eastern extremity. The second, situated farther westward, has a rounded regular summit. Between these hills are other and lower hills.

From Cape Julia the coast trends  $146^{\circ}$  for 5 miles to Cape Yenikale, and forms the western shore of the entrance to Kertch Strait.



## CHAPTER VIII.

### BLACK SEA—CAUCASIAN OR EASTERN SHORE; KERTCH STRAIT TO BATUM.

**Kuban Lake.**—The channel leading into Kuban Lake is formed between Bugaz Point, the extremity of a narrow sandy projection extending  $\frac{3}{4}$  mile southeastward from Taman Island and the north-west point of Timiteia Peninsula. It is about 250 yards broad and has a depth of 19 feet, but seaward of the entrance there is but 5 feet, with 30 feet  $\frac{3}{4}$  mile offshore. The lake is only navigable by flat-bottomed boats. On Bugaz Point stands a large building, and the village of that name, and there are 5 or 6 houses on the point of Timiteia Peninsula.

**Foul ground.**—In standing toward Bugaz Channel from the westward, care must be taken to guard against the foul ground which extends fully 3 miles southward from Cape Kishla. Cape Tuzla should be kept open of Panaghia outer islet until the Bugaz Channel bears  $67^{\circ}$ , and great attention should be paid to the lead.

**Mary Magdalene (Megæra) Rock.**—This dangerous rock, with a least depth of 2 feet and a patch of 4 feet 200 yards from it, lies nearly 5 miles southeast from Bugaz Channel and  $1\frac{1}{2}$  miles from the shore of Timiteia Peninsula. There is a depth of 15 feet  $\frac{1}{4}$  mile southeast of the shallow heads, and 10 fathoms  $\frac{1}{2}$  mile distant. Between the rock and the shore there is a depth of 5 fathoms.

**Range mark.**—Cape Panaghia, open of Cape Kishla,  $294^{\circ}$ , leads southward of the rock.

**Beacons.**—Two beacons on the shore serve as marks for Mary Magdalene Bank. The western mark, 57 feet high, is a mast surmounted by a checkered square,  $5\frac{1}{2}$  miles east-southeastward of Bugaz Channel. The eastern mark, 114 feet high, is a mast with two horizontal bars, situated  $2\frac{1}{2}$  miles from the western mark.

The western beacon, kept on a  $61^{\circ}$  bearing, leads westward of Mary Magdalene Bank.

**Timiteia.**—The Peninsula of Timiteia, about 15 miles in length, serves as a dyke to the waters of Kuban Lake. It takes a  $112^{\circ}$  direction from Bugaz Point, and toward its middle rises a platform about 3 miles in length, the sides of which are steep and of a reddish tint. About 11 miles from the Bugaz Channel is a coast-guard station and the Fort of Timiteia, now in ruins, but erected to command

the road to Taman which runs along this isthmus. There is said to be a depth of 4 fathoms along the peninsula, about  $\frac{1}{2}$  mile from the shore, but great attention must be paid, especially during light and variable winds, as the current, which generally sets to northwestward along the Caucasian coast, sets here toward the land. The ground also is rocky and foul.

Southeastward of the peninsula there are several hills and a plain, bordered by a sandy beach, which trends round to the southward and forms the roadstead of Anapa. The southern point of the roadstead, on which stands the town, is comparatively low and flat.

**Anapa Road—Banks.**—A rocky bank, with a least depth of 8 feet, extending in an east and west direction 600 yards, lies 500 yards northward of the town; and the beach eastward of the town is bordered by a bank with 3 fathoms on its edge 600 yards from the shore.

Foul ground extends 600 yards from the western side of the town off Anapa Point.

**Buoys.**—The northern side of the 8-foot bank is marked by two black spar buoys, with conical topmarks, moored in 16 and 40 feet, respectively. A similar buoy, in a depth of 37 feet, marks the foul ground westward of Anapa Point.

**Anchorage.**—The best anchorage is in the outer road, in about  $5\frac{1}{2}$  fathoms, mud and sand, with the white lighthouse on the north point of the town, bearing south-southwest about 1,200 yards; but this is exposed from northwest to south-southwest. More to the westward the bottom is mixed with gravel.

The inner anchorage, in about 2 fathoms, for small craft, southeastward of the 8-foot bank, is sheltered from southwesterly winds, and also protected from the sea by the foul ground to the northwestward. It may be entered by the channel between the 8-foot bank and the town, in which there is a depth of 3 fathoms, or by passing northward of that bank.

Small vessels must be careful in standing inshore, for  $\frac{1}{2}$  mile northeastward of the town a bar of sand is formed in the summer season off the mouth of Kumalir River.

**Anapa.**—The town of Anapa, formerly fortified, occupies the whole southern shore of the roadstead and lies 21 miles from the Bugaz Channel. It stands on a projecting crag of a long slope from the most western mountains of Circassia, which slope is prolonged northward and eastward toward Kuban Lake. The houses are generally of one story, and the streets are wide and straight. The only church in the town is built of stone and has a high tower which forms a good landmark. On the south and west sides the walls rise from a perpendicular calcareous rock, nearly 200 feet in height, but on the

north the land slopes toward the roadstead. Southeastward of the town are numerous windmills.

**Communication.**—There is regular communication with Odessa and Batum and intermediate ports by steamer three times a week; also telegraphic communication with all parts.

**Pier.**—A pier, 175 yards in length, extends from the northern shore of the town and has depths of from 7 to 12 feet alongside.

**Anapa Light**, fixed red, 40 feet above high water, is exhibited from an open pyramidal-shaped iron tower located in the city.

A fixed white light, 68 feet above high water, is exhibited from an open-shaped iron tower located 373 yards 120° from the front light.

These lights in range lead to the roadstead.

A fixed green light is shown from a tower near the city wharf.

A flashing white light with a red sector is shown from a tower located near the southwest part of the city.

**Storm Signals** are shown from a flagstaff near the guardhouse.

**Supplies** are scarce, especially in summer. Water is brought in barrels from the Kumalir River, which, after having meandered in the plain, used many years ago to discharge into the sea  $\frac{1}{4}$  mile northward of the town. Mounds of sand have now formed at its mouth, and it is only in winter that it has the power of forcing a passage.

**Directions.**—In coming from the southward, Anapa may be easily recognized by the diminished height of the mountains in its vicinity and by a long white cliff, which extends to the walls, but in the approach from the westward is not so easily made out, as several mountains are seen, which completely change the aspect of the country. These gradually disappear as the coast is neared. In standing for the anchorage from the southward a vessel should give Anapa Point a berth of at least 800 yards to avoid a rocky ridge which borders it and extends eastward as far as the second bastion; also the isolated 8-foot bank before described.

When coming from the westward or northwestward, the leading beacons by day or the leading light by night, 121°, lead to the outer anchorage. By day, if bound to the inner anchorage, the red tower near the pier in range with the pierhead, 184°, leads from the above range eastward of the 8-foot bank in a depth of about 11 feet. By night, vessels should keep within the limits of the green light shown from the lighthouse near the pier.

**Coast.**—From the small bastion standing at the southern extremity of Anapa, the coast trends south-southeastward, and the shore, which is bold, gradually becomes higher, terminating about 5 miles to the southward in a steep white cliff, the base of which is washed by the sea. It is steep-to, having 5 fathoms 400 yards, and 8 fathoms 500 yards from the shore.

**Utrish Point** (lat.  $44^{\circ} 45\frac{1}{2}'$  N., long.  $37^{\circ} 24'$  E.).—About  $8\frac{1}{2}$  miles  $158^{\circ}$  from Anapa, between two high reddish cliffs, is a hill about 250 yards in length, covered with brushwood, the extremity of which is named Utrish Point. When seen from the north or south it appears like an island, and has often been taken for one, being connected to the mainland by a low isthmus, 350 yards in length, destitute of vegetation. The point bordered by a shoal extending about 300 yards to the westward, but there are 8 fathoms close to its edges.

**Utrish Point Light**, flashing green, 50 feet above high water, visible 6 miles, is exhibited from a white hut on an iron truss located on the extremity of the point.

**Anchorage.**—The shores north and south of the point are clean, and small craft may obtain shelter from southerly winds in the cove to the northward; and from northerly winds in the cove to the southward, by anchoring close to the isthmus, in 5 or 6 fathoms water, with a hawser fast to the shore, as the bank is steep.

**Sampson Rock.**—To the southward of the two reddish cliffs which back Utrish Point is seen a third cliff, and then a low wooded shore backed by mountains terminating in a prominence 4 miles from the point, named Utrishenok, which has also the appearance of an island when seen a short distance from the coast. Sampson Rock, with a depth of  $2\frac{1}{2}$  fathoms, lies abreast of it  $\frac{1}{2}$  mile from the shore, with 14 fathoms inside.

**Ozerzik.**—From Utrishenok the coast trends east-southeastward and bold white cliffs reappear at the foot of conical mountains with round summits, separated from each other by narrow valleys. That of Dirzye is the most remarkable on account of its beauty. It is followed by another steep cliff and by a smaller one of angular form. The coast from thence trends more to the eastward, and a rich and picturesque valley comes in sight, which is inhabited and bordered by a beach slightly receding to the northward forming Ozerzik Roadstead, which is 13 miles from Utrish Point.

**Anchorage.**—The anchorage off Ozerzik, in 4 to 8 fathoms, is sheltered from winds from  $292^{\circ}$  through north to  $112^{\circ}$ , with good holding ground, 200 or 300 yards from the shore.

**Miskhak Anchorage.**—From Ozerzik the coast trends east-southeastward to Miskhak Point, which lies at the foot of a steep and elevated mountain. At its base, to the eastward, is the valley of Miskhak, abreast of which a vessel may anchor, sheltered from all winds from west through north to east-northeast. The shore from thence is low and runs about 2 miles east-northeastward to a small point, beyond which there is a lake and the low sandy point of Sudzhuk, which forms the western side of the entrance to Novorossisk Bay.



**Novorossisk (Sudzhuk) Bay.**—The entrance to Novorossisk or Sudzhuk Bay lies between Sudzhuk and Doob Points, which bear northwest by west and southeast by east from each other, distant nearly  $4\frac{1}{2}$  miles. The bay is about 8 miles long in a northwest direction from Doob Point to the circular beach at its head, which fronts a large wooded valley watered by the rivulet of Tzemess, the waters of which rarely reach the sea. The bay never freezes.

**Western shore.**—Sudzhuk point is low, thence the western shore of the bay is of moderate height, and 1 mile from Sudzhuk Point, to the northward of a salt lake, will be seen a ruined Turkish fort, while at the head of the bay is the harbor of Novorossisk, formed by two moles, extending from the northeastern and southwestern shores, respectively. On the western side of the harbor is the town of Novorossisk.

**Shoals.**—A reef extends southwestward from Sudzhuk Point, with a depth of 3 fathoms over it  $\frac{3}{4}$  mile from the shore, and 5 fathoms nearly 1 mile from the point.

Northward of Sudzhuk Point 5 fathoms will be found from 200 to 600 yards from the shore.

**Eastern shore.**—Doob Point, the eastern point of entrance to Novorossisk Bay, near which stands a lighthouse, is remarkable, being surrounded by white angular cliffs and lying at the foot of a mountain of moderate height. A valley to the northward separates it from the ridge of the Varada Mountains, which rise to the height of 2,345 feet and border the bay to the northeastward.

Kabardinski Fort stands at the head of a bay,  $1\frac{1}{2}$  miles  $57^\circ$  from Doob Point. Northward of this bay the shore becomes bold and steep. Three miles northwestward of the fort is Penai Point, composed of steep cliffs, and on which also stands a lighthouse. Thence the coast trends in a northwesterly direction to the head of the bay.

**Shoals.**—In the bay northeastward of Doob Point, more than  $\frac{1}{2}$  mile from the shore, and west-northwestward of Kabardinski Fort, is a small oblong reef about 500 yards in length, from north to south, with a depth of from 3 to 18 feet. The least depth of 3 feet lies  $296^\circ$  1,100 yards from Kabardinski Fort. In the bay to the southward of this, the 5-fathom curve is about 800 yards from, with gradually decreasing depths toward, the shore, but outside it there is a patch of  $4\frac{1}{2}$  fathoms, which is nearly 600 yards  $242^\circ$  from the depth of 3 feet already mentioned.

With this exception, the northeastern shores of the bay are fringed with shoal water for about 200 yards, with 5 fathoms  $\frac{1}{2}$  mile from the coast. About 400 yards southwestward of Penai Point there is a depth of  $2\frac{1}{2}$  fathoms.

**Middle Ground.**—In mid-channel, and just within the entrance of the bay, lies a bed of sunken rocks, of irregular depths, which

within the 10-fathom curve is nearly  $1\frac{1}{2}$  miles from north to south and  $1\frac{1}{2}$  miles from east to west.

On its southeastern part is a patch named Penai Bank, about 700 yards in extent, with a least depth of  $2\frac{3}{4}$  fathoms, from the center of which Penai Point Lighthouse bears  $34^{\circ}$   $1\frac{1}{2}$  miles; and a patch of 3 fathoms, about 300 yards in length in a north and south direction, lies close to the westward of this position.

On the western edge of the Middle Ground is a patch of  $3\frac{3}{4}$  fathoms, from which Penai Point Lighthouse bears  $48^{\circ}$   $1\frac{1}{2}$  miles; and in a south-southeast direction from this depth, 400 yards, is a patch of  $4\frac{3}{4}$  fathoms.

On the northern edge of the Middle Ground is Scheskari Rock, a patch of  $3\frac{1}{2}$  fathoms, from which Penai Lighthouse bears  $57^{\circ}$ , 1 mile.

**Buoys.**—Penal Bank is marked by a red spar buoy, with inverted cone topmark, moored in a depth of  $5\frac{1}{2}$  fathoms on the eastern side of the  $2\frac{3}{4}$ -fathom shoal.

The  $3\frac{3}{4}$ -fathom shoal is marked on its western side by a black spar buoy with upright cone topmark, moored in a depth of  $5\frac{1}{2}$  fathoms.

Scheskari Rock is marked on its western side by a black and white spar buoy, with spherical topmark, moored in a depth of 6 fathoms.

The buoys in Novorossisk Bay must not be depended on as they frequently break adrift.

**Range marks.**—A pyramidal white stone beacon named Penaiski, when in range with Penai Point Light bearing  $57^{\circ}$ , leads southward of the reef off Sudzhuk Point.

A pair of leading beacons, similar to the above-mentioned beacon and named Tzemesski, situated at the head of the bay, kept in range bearing  $330^{\circ}$ , lead up the center of the bay.

**Lights.**—A fixed white light, 337 feet above high water, is exhibited from a white stone tower located on Doob Point at the entrance to the bay.

A fixed red light with a sector alternating white and green, 64 feet above high water, is exhibited from a white house located on Penai Point.

**Novorossisk Harbor** is protected by two moles. The eastern one extends  $236^{\circ}$  and is about  $\frac{1}{2}$  mile long. The western extends from the town  $56^{\circ}$  for a little over  $\frac{1}{2}$  mile.

**Lights.**—A fixed red light, 32 feet above high water, is exhibited from a white iron post located on the west molehead at the entrance to the harbor.

A fixed white light, with a flashing red sector, 43 feet above high water, is exhibited from a white cylindrical iron turret located on the east molehead at the entrance of the harbor.

**Fogsignal.**—The fogsignal is a bell.

**Anchorage.**—The anchorages off the town at the head of the bay is considered very dangerous during the autumn and winter months on account of the northeast winds which then prevail.

Vessels waiting for berths at the piers anchor inside the moles as near the northeastern shore of the harbor as possible. If, owing to bad weather, they are unable to enter the harbor, the usual anchorage is near the northeastern shore of the bay, in the bight formed by that shore and the eastern mole of the harbor.

There is also anchorage in the small bay northward of Doob Point, in 5 to 10 fathoms, over sand and mud, about  $\frac{1}{2}$  to  $\frac{3}{4}$  mile from the shore, abreast Kabardinski Fort.

**Piers.**—On the northwestern shore of the harbor there are seven piers where vessels load, with depths of from 19 to 29 feet alongside their outer ends. Five of these piers belong to the railway company, one to the Standard Petroleum Co., and one, the northeasternmost, to the Russian Steam Navigation Co.

On the southwestern side of the harbor, in front of the town, is a mole for the use of the coasting trade, which has a depth of 24 feet at its outer end and a dredged area on either side of it with a depth of 23 feet.

**Directions—East Channel.**—Standing in for Novorossisk Bay at night, Doob Point Light, which is safe to approach, will be in sight when bearing northward of east and may be steered for, until the red sector of light from Penai Point is visible. Course must then be altered to north, or for the light, keeping within the red sector, which leads eastward of Middle Ground; and when the white sector of light from Doob Lighthouse is seen it must be kept in sight astern, which will lead northward of Middle Ground, and in mid-channel, until the red sector of light from Penai Lighthouse is seen, which kept in sight astern leads toward Novorossisk Harbor.

By day, the bearings of the lighthouses as given in the above directions will lead safely through the eastern channel.

**West Channel.**—To enter the bay by the western channel at night, Penai Point Light should be steered for, within the sector of white and green alternating light until the sector of white light with red flashes, shown from the lighthouse on the east mole head of Novorossisk Harbor, is seen, when it should be steered for, which will lead up to the harbor entrance.

By day, the pyramidal white stone beacon, already mentioned, kept in range with Panai Point Lighthouse, bearing  $57^{\circ}$ , will lead between the shoal water southeast of Sudzhuk Point and the  $3\frac{3}{4}$ -fathom patch on the Middle Ground, and when the Tzemesski beacons in the north part of the bay come in range  $337^{\circ}$  they should be steered for, until the town of Novorossisk bears about  $303^{\circ}$ , when a course may be shaped for the anchorage or the harbor.

**Pilots.**—Pilotage is not compulsory. A pilot from the railway company (unlicensed) comes on board to take vessels alongside the piers.

**The town** of Novorossisk contained in the year 1900 a population of 40,384. The Standard Petroleum Co. have their works and place of shipment on the northwestern side of the harbor, where the oil is brought by pipes from wells many miles distant. Seamen are admitted to the town hospital.

**Communication.**—By rail to Tichorezkaia Junction, on the Rostov and Vladikavkas Railway; by steamer with the Black Sea ports by the Russian Steam Navigation Co.; with Marseilles by the Messageries Maritime and Paquet Companies; and with England by the Wilson Line. By telegraph, via Anapa, with all parts.

**Supplies.**—In normal times fresh meat, vegetables, and bread can be obtained. The water is not good.

Coal and liquid fuel are not kept in stock for supplying shipping.

**Repairs.**—There are workshops where repairs to the hulls and machinery of vessels can be effected.

**Quarantine.**—The quarantine station is not used. Vessels in quarantine must proceed to Theodosia.

**Coast.**—The long range of angular cliffs which border Doob Point is broken  $4\frac{1}{2}$  miles to the southeastward by Ashampe Creek, where also is the village of Natukhadi. The coast then trends more eastward, but gradually lessens in height as Ghelenjik Bay is approached. A small reef extends about 150 yards westward from an angle of a cliff not far to the southward of Ashampe Point.

**Ghelenjik Bay** (lat.  $44^{\circ} 33' N.$ , long.  $38^{\circ} 4' E.$ ).—The entrance to Ghelenjik Bay is about 1 mile wide between Tliuvieuse Point (which is of moderate height, of a level surface, and without vegetation) to the southeast, and a low point to the northwest. A long range of white cliffs extends from Tliuvieuse Point in a southeast direction toward Mezib, six of which are of semicircular form.

The interior of Ghelenjik Bay, oval shape, is about  $2\frac{1}{2}$  miles wide from northwest to southeast and  $1\frac{1}{2}$  miles long. It has a depth of 8 fathoms at its entrance and 5 to 6 fathoms in the middle, over sand and mud, gradually shoaling to the depth of 3 fathoms toward the shore, which is bordered by a bank of sand. The village lies on the southeastern shore, westward of which is a small stream named Kunlezi River.

The bay is open from west-southwest to south, but the winds from that quarter are not dangerous. The northeasterly winds, although as frequent and violent as those in Novorossisk Bay, are less feared, as the entrance is open, and vessels anchored in the middle of the bay can slip and stand out to sea. It may here be noticed that the wind

blows with more violence in front of the ravines between the spurs of the Varada mountain ridge, than at their projecting point. Vessels intending to remain any time at anchor should moor with their large anchor to northeastward. There is good anchorage for those of light draft abreast the landing place, in 12 or 13 feet water.

**Shoals.**—Shoal water extends in a west-southwest direction 800 yards from Tliuvieuse Point, there being  $3\frac{1}{2}$  fathoms at that distance, and a patch of  $2\frac{1}{2}$  fathoms, 600 yards, between which and the point there is a depth of  $4\frac{1}{2}$  fathoms. Also a patch with  $1\frac{1}{2}$  fathoms lies 600 yards  $191^\circ$  from the point. The northwestern side of the entrance is fringed by a bank extending from 200 to 400 yards.

**Buoys.**—A red spar buoy, with inverted cone topmark, is moored in  $5\frac{1}{2}$  fathoms on the northwestern side of the entrance, 600 yards,  $191^\circ$  from the western entrance point.

A red spar buoy, with inverted cone topmark, is moored in  $4\frac{1}{2}$  fathoms, eastward of the foul ground on the west side of the bay.

**Ghelenjik Light**, fixed red, 52 feet above high water, is exhibited from a stone dwelling with a square tower located on the northeast shore of the bay.

An alternating white and green light, 63 feet above high water, is exhibited from a white iron hut on a truss located on the southeast point of the entrance to Ghelenjik Bay.

**Beacon.**—A pyramidal stone beacon, 28 feet in height, and elevated 150 feet above the sea, stands on the hillside 1,500 yards,  $48^\circ$  from the lighthouse.

This beacon in range with the lighthouse, bearing  $48^\circ$ , leads into the bay.

**Communication.**—There is regular steamer communication with Odessa, Batum, and other Black Sea ports.

**Coast—Mezib (False Ghelenjik of the Turks).**—The valley of Mezib lies about 5 miles southeastward of Tliuvieuse Point, at the extremity of the white cliffs. Shelter may be found in the roadstead from northwest winds, round by north to south, in about  $5\frac{1}{2}$  fathoms.

Another white cliff will be seen at Khopitsai, which is  $7\frac{3}{4}$  miles southeastward of Tliuvieuse Point, eastward of which is the valley of Dzhankot between two bold reddish cliffs, and then a projecting point, named Cape Idokopas.

As a general rule the Caucasian coast is bold to approach, with the exception of a few points, which will be hereafter noticed, the average depths being 6 fathoms at 600 yards, 8 fathoms at 800 yards, and 10 to 12 fathoms at  $\frac{1}{2}$  mile from the shore.

**Cape Idokopas** is one of the most projecting points of the coast. Its summit is flat and covered with pine trees, some of which hang

over the red cliffs. It is bordered by a reef and should be given a berth  $\frac{1}{4}$  mile.

**Pshad Anchorage.**—Eastward of Cape Idokopas the coast, composed of roundish cliffs, trends 9 miles  $112^{\circ}$  to Chugovkopas Point. Between the eastern of these cliffs and the point lies the valley of Pshad, in which is situated the small fort of Novotroitskoe (New Trinity), in ruins. The anchorage is abreast the valley, which is fronted by a beach, but it is exposed from  $146^{\circ}$ , through south, to  $281^{\circ}$ . A depth of 4 to 5 fathoms, over mud and sand, will be found 300 yards from the shore. Care must be taken to avoid some sunken rocks which lie about 150 yards from the shore, off the mouth of a rivulet, backed by a mountain which bounds the valley to the northward and also off a small point on the southern shore.

In approaching this anchorage from the southward, Chugovkopas Point, which is of moderate height and flat surface, with cliffs of a deeper tint than those of Idokopas and with a high conical isolated mountain near it, will be first recognized; then, Cape Idokopas and the bold circular cliffs, and in the interior a round summit and a peak, while nearer the coast a bare cone tops the other mountains.

**Beta and Vulcan Bays.**—From Chugovkopas Point the coast turns 1 mile northeastward to Beta Bay, which affords a good anchorage, sheltered from westerly winds but open to the southward. From thence it recedes to the northward and trends again to the eastward to Vulcan Valley, 6 miles from the point, off which another anchorage presents itself, but is more open to westerly winds. Fort Michailoffskoe lies on the western side of the anchorage.

The village of Vulcan is situated in the valley about 1 mile from the shore.

**Dzhubg Anchorage.**—About 7 miles  $112^{\circ}$  from Vulcan is the anchorage of Dzhubg, which is formed between the two headlands. This part of the coast is composed of white circular cliffs. The last of them, the headland eastward of Dzhubg, is bordered by a bank, and must be given a berth of 100 yards.

**Dzhubg Light**, alternating red and green, 37 feet above high water, visible red 6 miles, green 3 miles, is exhibited from a white hut on pillars located near the frontier coastguard station.

**Fogsignal.**—The fogsignal is a bell.

**Communication.**—There is regular communication by steamer with Odessa, Batum, and other Black Sea ports.

**Shapsukho (Nechepsuko) Bay** lies about  $2\frac{1}{2}$  miles eastward of Dzhubg, fronting a long valley which may be easily distinguished at a distance by a high mountain backing it to the northward. The valley is watered by a rivulet which reaches the sea through low ground, having a considerable beach in front. Here are several blockhouses, a fort, named Tenginskoe, constructed on the plain, westward of

which is Novo Michailoffskaya. In this bay, as in almost all the roadsteads on this coast, a vessel should anchor some distance from the shore in order to be able to clear it in case heavy weather should come on from seaward. Although this seldom happens, yet it will not be prudent to anchor in less than 5 or 6 fathoms, about 600 or 800 yards from the beach. It invariably occurs, along this coast, that immediately the sea gets up the surf is very strong along the beach, and boats can not approach it.

From Shapsukho the coast changes its aspect, the mountains receding farther from the shore, with their bold slopes wider apart, less regular in form, and much lower.

**Tu Anchorage.**—Tu Point, 9 miles southeastward of Shapsukho, may be easily recognized by Mount Tu, of conical form, rising from its center. It stands to the northward of Tu Cove, which is about  $\frac{1}{2}$  mile in diameter and situated at the entrance of a valley. Vessels may anchor here in 5 or 6 fathoms between two cliffs, which mark the entrance and which are bordered by sunken rocks, extending 200 yards from the shore.

**Tuapse Bay—Cape Kadosh.**—The coast from Tu Anchorage trends to the eastward, and then bends southward to Cape Kadosh or Chardak Point, situated 9 miles southeast of Tu Point and which is immediately followed to the eastward by Tuapse Bay. This bay will be recognized by the lighthouse on Cape Kadosh, a steep cliffy point, as well as by the village of Velyaminov, standing on table-land about 2 miles eastward of it.

The roadstead is open to south and southwesterly winds, but protected from the northwest by Cape Kadosh. Anchorage in 6 fathoms will be found 1 mile from the shore, and in 10 fathoms about 5 miles.

**Cape Chardak (Kadosh) Light,** fixed and flashing white, 203 feet above high water, is exhibited from a white octagonal stone tower located on the cape.

**Tuapse Port.**—The port of Tuapse, 1 mile eastward from Cape Kadosh, is formed by two moles. The eastern mole extends from the shore in a southwesterly and westerly direction for about 850 yards. The western mole, situated  $\frac{1}{2}$  mile from the eastern mole, extends 400 yards in a south-southeasterly direction. The passage between the moles is about 125 yards wide.

There is a depth of 24 feet in the port alongside the outer part of the eastern mole and of from 22 to 23 feet alongside the inner part of the same mole. The outer part of the port is dredged to a depth of 24 feet.

The town of Tuapse is situated to the eastward of the port.

**Lights.**—A fixed red light, 41 feet above high water, is exhibited from a red hut located in front of the entrance to the port.

A fixed white light, 67 feet above high water, is exhibited from a white hut on pillars located  $32^{\circ}$  from the front light.

These lights in range lead into the harbor.

Two fixed red lights, placed vertically 32 and 37 feet above high water, are exhibited from a white iron post located on the extremity of the eastern mole.

Two fixed white lights, placed vertically 30 and 35 feet above high water, are exhibited from a white iron candelabrum located on the southern extremity of the western mole.

**Communication.**—There is steamer communication with Odessa, Batum, and other Black Sea ports. There is telegraphic communication with all ports.

**Coast.**—From Tuapse Bay the coast trends southeastward in almost a direct line for 34 miles to Zhoobzhe Point, which causes a difficulty in recognizing the different localities along its shore. The lofty summits of the mountains on the coast would serve as landmarks if they were not so often enveloped in fog or clouds. The most southern as well as the most remarkable, from its singularity of form, is Mount Nugaigus (Shugus), 10,640 feet high.

**Psezuape Road.**—The valley of Psezuape may, however, be recognized by the military fort of Lazareff, situated on the site of the old fort on the bank of a rivulet of that name. The roadstead is exposed to all sea winds from northwest to southeast.

**Subeshik Bay** lies nearly 9 miles  $146^{\circ}$  from Psezuape, and may almost be mistaken for it, as the aspect of the beach is the same, and the small fort of Golovin (Shakhe), which stands here, has very much the appearance of the preceding one. This anchorage is also much exposed. A rivulet flows into the sea here.

**Socha Buitkh Point.**—From Zhoobzhe Point, Socha Buitkh Point, which is of medium height and rounded, lies southeastward 8 miles. The space which separates them forms a large and verdant valley, intersected by hillocks and bordered by a beach. Fort Mamai Kale formerly stood here, on the bank of the Psakhe River. Another river, the Socha Psta, finds its way to the sea a little to the northward of Socha Buitkh Point. The Russian fort named Navaginskoe (Dahovsky) stands on an eminence on the shore between this river and the point, and is commanded by a stone tower, which may be seen from a great distance.

The current is much felt here running to the northwestward.

**Socha Light**, fixed white, 120 feet above high water, is exhibited from a white stone tower located on Socha Buitkh Point.

**Socha.**—The valley through which the Socha Psta River flows is bounded on the east by a plateau on which stands the town of Socha. From seaward a stone church with bell tower will be seen, also a



number of houses built on the low left bank of the river and on the plateau. Eastward of the church, along the shore, are a number of fine houses. Above the town are vineyards.

Socha is the center for the administration of the district and possesses Government offices.

**Communication.**—There is steamer communication with Odessa, Batum, and other Black Sea Ports. There is a telegraph station at Socha.

**Anchorage.**—Sailing vessels anchor off the town in a depth of about 16 fathoms, mud and sand. Steam vessels can anchor closer in.

**Coast.**—From Socha Buikh Point to Mustakuba Point, 7 miles to the southeastward, the shore is low, abrupt, and wooded, and is backed by a mountain named Khukhup.

Many fine residences are situated along this coast.

**Khosta**, formerly known by the name of Kamisler, where a rivulet flows into the sea, is a little to the southward of Mustakuba Point. The low land commences here, covered with magnificent forests, running down to within 20 yards of the beach and extending beyond St. Duka Fort. To the southeastward some lofty mountains are seen:

Small vessels can find shelter from northwest winds in the center of the bay, in a depth of about  $3\frac{1}{2}$  fathoms, over fine sand. In calm weather boats can enter the river.

**Adler Point** lies 12 miles southeastward from Socha Buikh Point, and thence the coast trends 2 miles southeastward to Konstantin Point. The old fort of St. Duka is a little northward of the mouth of the Mezyumta River, which enters the sea southward of Adler Point and village. A bank of shingle has been formed off the mouth of the river, extending 200 yards from the shore, where there is a depth of 5 fathoms.

**Adler (St. Duka) Point Light**, alternating white, red, white, and green, 35 feet above high water, visible white 7 miles, red 6 miles, green 3 miles, is exhibited from a white hut on pillars located on the beach about 700 yards northwest of the village.

**Anchorage.**—There is a depth of 40 fathoms 600 yards from the shore, with the fort bearing  $11^{\circ}$  or  $56^{\circ}$ ; but between those bearings there is a depth of 20 fathoms at that distance. The best anchorage is in about 10 fathoms, with St. Duka Fort bearing about northeast 500 yards from the shore.

**Communication.**—There is steamer communication with Odessa, Batum, and other Black Sea ports.

**Gagri.**—From Konstantin Point the coast trends 13 miles in a  $112^{\circ}$  direction to the foot of Mount Oschten, which runs boldly down to the sea. At its base is a beach of small extent, on which stands the fortress of Gagri, near the entrance to a narrow pass. The depths

here are considerable and the anchorage indifferent. Three miles southeastward of the fort is the village of Gagri and between them is the mouth of the Gagripsh River.

**Gagri Light**, fixed red, 56 feet above high water, visible 5 miles, is exhibited from a mast located on Gagri Pier.

A fixed red light, 168 feet above high water, visible 9 miles, is exhibited from a white rectangular beacon located 200 yards  $26^{\circ}$  from the front light.

A fixed red light, 217 feet above high water, visible 9 miles, is exhibited from a white rectangular beacon located 244 yards  $26^{\circ}$  from the front light.

These three lights in range lead into the roadstead.

A fixed green light, 72 feet above high water, is exhibited from a pole on a white triangular beacon located about 1 mile southeast of the first alignment.

A fixed green light, 129 feet above high water, visible 4 miles, is exhibited from a pole on a white triangular beacon 322 yards  $108^{\circ}$  from the front light.

These lights in range mark the anchorage for small vessels.

**Communication**.—Steamship service as at Adler. There is a telegraph station.

**Coast**.—From the southern side of the gigantic rock of Gagri a low and wooded land trends for 4 miles southward to the Bzuib River. From thence the coast runs  $2\frac{1}{2}$  miles southeastward to Pitsunda Point.

**Pitsunda Point** has on it a small fort, near which there is a church, and may be recognized by the lighthouse, which, with a low dwelling house attached, stands to the southward of a thick clump of tall pine tress. The dome of an ancient church may be seen from some positions through openings between the trees.

**Pitsunda Point Light**, alternating fixed and group flashing, with white and red flash, 118 feet above high water, is exhibited from a white circular iron tower located on the outer extremity of the point.

**Pitsunda Road**.—Eastward of Pitsunda Point, which is safe to approach, is the bay of the same name. A long and wide beach beginning at the point extends  $1\frac{1}{2}$  miles to the northward, thence trending eastward, when several white cliffs reappear, and extend in an easterly direction as far as Tolstoi (Abikhu) Point, 6 miles from Pitsunda Point.

**Shoals**.—About  $\frac{1}{2}$  mile to the northwestward of Tolstoi Point rocks extend 500 yards from the shore; and southeastward of the point rocks extend to a distance of  $1\frac{1}{2}$  miles.

**Anchorage**.—The anchorage in this roadstead is inconvenient, there being a depth of 20 to 25 fathoms a short distance from the coast and from 6 to 8 fathoms 30 yards distant. It is also exposed

from east-southeast to south. There is a better anchorage, in 18 fathoms, mud bottom, abreast the first small cliff at the bottom of the bay, which is divided into two portions by a narrow gully. Small vessels may anchor 200 or 300 yards from the shore in 6 or 7 fathoms, but the mud is soft. This is a good anchorage for the vessels that load here with boxwood. It is said that the sea winds seldom blow home and that little inconvenience is felt from the swell rolling in from seaward.

**Bombori Road.**—The low cliffs beginning in Pitsunda Road terminate a little to the eastward of Tolstoi Point. Thence the coast trends southward to Suksu Point, 5 miles, forming the roadstead of Bombori. The greater part of this shore is backed by low wooded land and at a distance by high mountains, remarkable for their being divided in three deep gullies. From some positions may be seen, on an elevation which commands the plain of Bombori, a palace, with an ancient church near it, and nearer the sea the dwelling houses of the old Fort Bombori and part of its suburbs. On the shore are the ruins of a church, a guardhouse, and of several other buildings.

**Shoals.**—Rocks extend 800 yards southeastward of Suksu Point, and also front the shore for  $1\frac{1}{2}$  miles to the northwestward of it. Vessels therefore should give the point a wide berth in passing.

From the northern shore of the road near Tolstoi Point, rocks extend, as mentioned above, to a distance of  $1\frac{1}{4}$  miles.

**Anchorage.**—Vessels anchor at various distances from the shore off Bombori. There are 20 fathoms  $1\frac{1}{2}$  miles, and 12 to 10 fathoms  $\frac{2}{3}$  or 1 mile, sheltered from  $292^{\circ}$  round by north to  $135^{\circ}$ . When the surf is not heavy, they anchor abreast the guardhouse. Here, as elsewhere on the Caucasian shore, the Anatolian coasting craft are hauled up on the beach.

**Coast.**—From Suksu Point the coast becomes irregular and trends eastward for 14 miles. It then bends southeastward to Sukhum Point, which is 19 miles from that of Suksu. Nearly midway between these points may be seen, rising near the shore, two conical hills covered with wood. On that to the eastward are the remains of some ancient walls and two towers, one of which crowns its summit. This locality, as also the river close to it, bears the name of Psereta (ancient Anakonii). About 14 miles to the northward of Psereta, between mountains covered with snow, may also be recognized a high vertical rock, surmounted by a peak, and commanding a pass, named by the Turk Pilav Tepesi, and by the Russians Tzeferbeya Shapka.

Eastward of Psereta is Novo Afonski Monastery, near which is a small mole.

**Gudaut Anchorage** lies in the bend of the coast, about 3 miles eastward of Suksu Point, but it is exposed to southerly winds and only used by coasters.

The shores of the bay are foul to 400 yards, and a rock with a depth of 15 feet over it is situated 1,800 yards  $118^{\circ}$  from Gudaut Lighthouse.

**Gudaut Light**, flashing red, 54 feet above high water, visible 6 miles, is exhibited from a white hut on pillars located on the high ground at the extremity of the village.

**Beacon**.—A mast beacon with supports, 30 feet above the sea, situated 50 yards behind the lighthouse when in range with it, bearing  $305^{\circ}$ , leads clear of the 15-foot rock mentioned above and of a rocky shoal, with 5 fathoms over it, situated 1.2 miles  $137^{\circ}$  from the lighthouse.

**Communication**.—Three steamers of the Russian Steam Navigation Co. plying between Odessa and Batum call regularly at Gudaut, and there is a telegraph station.

**Sukhum Bay**.—From Sukhum Point the coast trends east-north-eastward for about 3 miles, and then again southward, forming Sukhum Bay. In approaching it from the westward a narrow, deep gorge may be seen, bordered by steep precipices, and among their distant summits, white with snow, there is one in the shape of a saddle. The lighthouse on Sukhum Point and several barracks standing on an eminence at the foot of the mountains serve to point out its position. From the southward, the village and fortress of Sukhum Kale, situated on a plain backed by mountains, may be recognized from some distance.

**Sukhum Point** may be rounded close-to, as a depth of 30 fathoms will be found 200 yards from it, but between the point and the fortress, on the edge of a gravel bank which borders the bight and extends 1,000 yards from the shore, there is only a depth of 5 fathoms, with deep water close-to the southward of it.

**Sukhum Light**, flashing white, 121 feet above high water, visible 6 miles, is exhibited from a white circular iron tower located on Sukhum Point.

**Fogsignal**.—The fogsignal is a bell.

**The town** of Sukhum, built on the site of the ancient city of Dioscurias, is small; having a population of about 1,900, and has a pleasing aspect owing to the luxuriant vegetation which surrounds it, but the climate is deadly at certain seasons of the year, and with a view to its improvement numbers of the blue gum tree (*Eucalyptus globulus*) have been planted.

**Communication**.—There is regular communication with Odessa, Batum, and other Black Sea ports.

**Anchorage**.—The anchorage, which is indifferent, from the steepness of the bank and liability to be blown off, is in about 6 or 8 fathoms, 200 to 300 yards southward of the customhouse and eastward of the fort, as the depths do not increase so rapidly in this

direction; but southward of the fort, it shelves off suddenly to 60 fathoms  $\frac{1}{4}$  mile from the shore. Vessels moor with one anchor to the southwest and the other toward the mouth of Besleta Rivulet, which flows into the sea near the quarantine establishment. The bay is open to southwesterly winds, which are seldom dangerous, but send in a heavy swell. The land winds are sometimes troublesome. There are several mooring buoys in the anchorage.

**Beacons and lights.**—Two white iron framework masts, 82 yards apart, each surmounted by a ball, situated on the northwest and southeast angles, respectively, of the fort, when in range bearing  $284^{\circ}$ , indicate the southern limit of the anchorage.

At night a fixed red light is shown from the front (eastern) beacon and a fixed white light from the rear beacon, at elevations of 38 and 61 feet, respectively, above the sea.

**Kelasur Valley.**—About  $2\frac{1}{2}$  miles southeastward of Sukhum Kale lies the Valley of Kelasur, through which a rapid stream runs. A bazaar, backed by a hill on which stands the remains of an ancient fortress, draws a number of coasters here for the purpose of petty trade.

**Caution.**—The bridge near the mouth of Kelasur River is lighted by six lantern lights, which should not be mistaken for the town lights at Sukhum.

**Kodor Point** (lat.  $42^{\circ} 51' N.$ , long.  $41^{\circ} 7' E.$ ).—From Kelasur the coast trends southward  $7\frac{1}{2}$  miles to Kodor Point, which has given its name to the river flowing into the sea close southward of it. Care must be taken to avoid a bank which extends  $\frac{3}{4}$  mile northwestward from the point.

**Caution.**—The coast line between Kodor Point and Batum, a distance of about 80 miles, is said to be incorrectly shown on the chart, especially as regards longitude. A survey is in progress, and until the results of it are known the coast must be approached with caution.

**Coast.**—From Kodor Point the coast trends 4 miles southeastward to Iskuri Point. It then bends eastward for 9 miles to the mouth of the Tamuish River, and from thence takes a  $163^{\circ}$  direction for 55 miles to Fort St. Nikolai.

The whole of the country, commencing several miles northward of Kodor Point, to beyond Fort St. Nikolai, which formerly was the Russian boundary to the southward, is an immense low plain, varied by some slight elevations covered with trees. It is bounded northward by the mountains of the Caucasus, the tops of which are always covered with snow and to the southward by some of the mountains of Anatolia.

**Reef.**—A rocky reef fronts the shore from Baglan Point, situated 1 mile westward of Iskuri Point, to Tamush Point, situated 6 miles

eastward of it. At Iskuria Point the reef is only 200 yards wide, but 5 miles farther eastward it extends more than  $\frac{1}{2}$  mile from the shore.

**Ochemchiri Anchorage.**—All the anchorages along this coast are exposed to winds from seaward, but several of them are frequented by coasters.

Ochemchiri Anchorage, lying 13 miles southeastward of Iskuria Point, has good holding ground at  $1\frac{1}{2}$  miles from the shore. This anchorage is dangerous during the winter months. There is a telegraph station and a customhouse post at Ochemchiri. No supplies are obtainable.

**Ochemchiri Light**, alternating green and white, 37 feet above high water, visible white 6 miles, green 3 miles, is exhibited from a yellow box located near the center of the village west of the frontier guard station.

**Anakria Anchorage** is abreast Fort Anakria, which stands about 20 miles southward of Ochemchiri, where the coast projects a little to the westward, and where the Ingur River empties into the sea. The anchorage is on a bank  $1\frac{1}{2}$  miles from the shore, in a depth of 7 to 10 fathoms, with the fort bearing  $67^\circ$ . This bank falls abruptly into depths of over 50 fathoms. There is a depth of 8 to 4 feet on the bar of the Ingur. The current in the river is very strong. Mount Olen, about 12 miles from the shore, lies eastward of this anchorage.

**Redoute Kalessi.**—This town and fortress stands at the mouth of the Khopi River,  $6\frac{1}{2}$  miles  $157^\circ$  of Anakria. Its commercial communications are of some importance. A flagstaff on the southern side points out the fortress, which, if intending to anchor, should be brought to bear  $95^\circ$   $1\frac{1}{2}$  miles, where there is a depth of 7 fathoms over a muddy bottom. To the northeastward will be seen three small hills, the middle one of which, Mount Olen, is more striking than the others, as from this direction it resembles a saddle. The southeastern one is known as Poti Hill. At this anchorage, with light winds, vessels will ride to the current, which runs to the northward. After severe storms it sweeps along quantities of wood, which float down into the sea from the rivers on the coast.

**Khopi River.**—A bar of sand and stones, which is liable to shift, has formed at the entrance to this river, so that flat-bottomed boats, or craft drawing less than 5 feet, are alone able to pass it; inside, the depths increase from 3 to 6 fathoms. In rough weather, the waves being then opposed to the current of the river, causes a kind of rapid, which makes it impossible for any craft to cross the bar. This is felt as a great inconvenience as the surf on the beach prevents goods from being landed outside.

**Rion River**, situated 7 miles southward of Redoute Kalessi, is navigable by boats for 80 miles. About 2 miles from its mouth the

river bifurcates, the larger and more important channel continuing to the southward. The other turning slightly north, forms with the main stream a triangular island, known as Bolshoi Island, which is now built over and forms a suburb of Poti.

**Poti Harbor.**—The harbor, consisting of an outer and inner basin, is situated on the right bank of the northern entrance to the Rion.

The works consist of two moles formed of huge masses of concrete. The south mole or breakwater extends from the shore in a westerly direction for 600 yards and then in a northerly direction for about 1,200 yards. The north mole, which is situated about  $\frac{1}{2}$  mile northward of the south mole, extends from the shore in a westerly direction for a distance of 400 yards; and on the east side of the outer basin is middle mole, 300 yards in length, which is being extended.

The north mole, middle mole, and the inner basin are connected with the Poti-Tiflis Railway.

The harbor is connected with the town by a narrow road, which skirts the Rion as far as the railway station, whence it crosses to the southern bank by a substantial iron bridge. A wooden bridge also connects the harbor with the island, but communication thence across the principal arm of the Rion is restricted to boats.

A submarine cable has been laid across the entrance to the inner basin, marked by boards with "Кабель" on them.

Foreign ships are berthed at the extension of the north mole and on the northern side of the inner basin.

There is an elevator for loading manganese in the inner basin.

**Depths.**—The entrance to the harbor is 560 feet in width and has a depth of from 26 to 27 feet. Within the harbor there is a depth of from 22 to 26 feet, but it is liable to silt up. Dredging and other works are still in progress.

**Buoys.**—A red spar buoy is moored off the extremity of the north mole and a black spar buoy off the northern end of the south mole or outer breakwater.

**Poti Light,** flashing white, with a green sector, 37 feet above high water, is exhibited from a white lantern on trusses located on the north head of the breakwater.

**Range lights.**—A fixed red light, 27 feet above high water, is exhibited from a lamp-post north of the harbor.

A fixed red light, 35 feet above high water, is exhibited from a lamp-post located 150 yards  $114^{\circ}$  from the front light.

These lights in range lead into the new harbor.

**Harbor lights.**—A fixed white light is exhibited from the elbow of the breakwater.

Two fixed blue lights are exhibited from the extremity of the north mole.

**Range lights.**—A fixed green light, 21 feet above high water, is exhibited from a square iron tower located on Bolshi Island.

A fixed green light, 33 feet above high water, is exhibited from a square iron tower located 233 yards 161° from the front light.

These lights in range lead into the harbor.

**Anchorage.**—The anchorage in Poti Road is west-southwestward of the mouth of the river, about 2 miles from the shore, in 10 or 12 fathoms, muddy bottom, but the soundings are irregular.

**Lifeboat.**—There is a lifeboat station and rocket apparatus established at the head of the north mole.

**Regulations.**—Entrance into the port of more than one vessel at a time is prohibited.

Vessels entering must give way to vessels leaving the port.

Agents of vessels arriving must notify the port office not less than 24 hours before the arrival of the vessel.

Foreign vessels must not enter the harbor without a pilot.

The pilot directs entering vessels from his boat.

Foreign vessels can only enter or leave between sunrise and sunset.

**Pilots.**—The pilotage into Poti Harbor is compulsory. Pilots will board vessels in the roads on the pilot flag being hoisted.

**Poti (ancient Phasis)** (lat. 42° 9' N., long. 41° 38' E.) is situated on the left bank of the southern branch of the Rion, about 1 mile from its mouth. Two small hills lie to the southward, which are slightly higher than Poti and Olen Hills to the northward.

The town, which is very unhealthy, is chiefly composed of a collection of wooden houses, built on the swampy delta of the Rion. During the last few years, however, the town has improved, and a number of good brick and stone houses have been built. The marshy forests throw out dangerous fogs, which produce ague, especially in the months of July and August. The population of the town is about 9,000.

**Communication.**—There is regular communication with Odessa, Batum, and other Black Sea ports; also with Liverpool. Rail to Baku on the Caspian via Samtredi and Tiflis, and telegraphic communication with all parts.

**Storm signals** are hoisted on the mast on the southwest angle of the south mole or breakwater.

**Quarantine.**—Pratique is granted, and customs formalities carried out after vessels are brought into the harbor.

**Rion Entrance—Depths.**—This river, like the Khopi, has a bar of sand and stones at its mouth, which, being exposed to westerly gales, is constantly silting up. Under ordinary circumstances there is a depth of about 5 feet on the bar of the southern entrance, but inside the depths increase to 3 fathoms.



**Light.**—An alternating flashing red and white light, 118 feet above high water, visible 13 miles, is exhibited from a white circular iron tower located on the point near the mouth of the Rion River.

**Beacons and buoys.**—Two movable beacon poles are situated on the south side of the southern entrance to the river, which, when the bar is passable, are surmounted by square shields. The square surmounting the outer mark is painted red, with a black disk in the center that on the inner mark is painted white. When the bar is not passable the square topmarks are removed.

Spar buoys with flags as topmarks are placed on each side of the river inside the bar, those on the starboard side of the channel being white and on the port side red.

A red spar buoy with inverted cone topmark, moored in a depth of 32 feet, marks the extremity of a shoal extending in a northwesterly direction from the river entrance.

**Directions—Signals.**—For small vessels wishing to enter the river, the beacons kept in range by day lead over the bar in the best water, the depth on which is indicated from the signal staff, near Poti Lighthouse, by the International Code.

When inside the bar the channel is between the white and red buoys. It is not advisable to enter the river without a pilot.

**Coast.**—**Fort St. Nikolai** is situated 16 miles south-southeastward of Poti, at the mouths of the Nathaniel (Natuyeba) and Cholok Rivers. There is good anchorage  $\frac{1}{2}$  mile offshore in 5 fathoms, but it is as much exposed as those which precede it.

**Kintrish.**—From Fort Nikolai the coast still takes a southerly direction for nearly 6 miles to Kintrish, where the extensive plains of Mingrelia and Gurda gives place to the mountains of Anatolia. It then trends to the southwestward, 11 miles to Batum.

**Batum Bay**, which is about  $1\frac{1}{2}$  miles wide from east to west and  $\frac{1}{2}$  mile long from north to south, lies at the extremity of an extensive plain covered with verdant trees and watered by several rivulets. It is backed by terraced mountains, over which the summits of others of still greater height are seen. East-northeastward of Burum Tabia Point, the western point of the bay, is a very remarkable elevation near the shore, surrounded by the waters of the Kareli River, which empties into the sea. Its form is that of a flat cone with steep sides, and a large building stands on its summit.

On Burum Tabia is a fort with arsenal and barracks, and a lighthouse.

The Bartzkhana (Barshana) River flows into the bay about 1 mile eastward of Burum Tabia.

**Shoals.**—A shoal, with  $2\frac{1}{4}$  fathoms least water, about 200 yards in extent in an east and west direction, lies 800 yards eastward from the lighthouse on Burun Tabia. It is the western end of a narrow bank, about 200 yards wide, which extends in a westerly direction, about 1 mile from Tbil Tskhali River, on the east side of the bay, having several depths on it of  $2\frac{1}{4}$  to 3 fathoms. From the western extreme of the bank, soundings of  $4\frac{1}{4}$  to 5 fathoms extend in a northerly direction for about  $\frac{1}{2}$  mile. The whole of the bay east of this is shoal, with depths varying from  $2\frac{1}{4}$  to  $4\frac{1}{4}$  fathoms.

**Buoys.**—Two red spar buoys are situated 1,100 and 800 yards northeastward of Cape Burun Tabia to mark the 5-fathom curve.

**Winds.**—Batum Bay affords shelter from winds between north-west through south to east, and the only winds to be feared are gales from the northward, which are, however, very rare. Northeast gales are said to never blow home, and only on rare occasions do vessels moored with their sterns fast to the shore have to haul off. Gales from south-southwest to north-northwest send a heavy sea into the bay, causing vessels to roll and pitch at their moorings and often to part their hawsers and cables, when, if the harbor is full of shipping, they run great risk of collision with other craft. Vessels within the breakwater have frequently with southwesterly winds to haul off from the quay.

The prevailing winds and gales come from the westward and especially from the southwestward. This latter wind sometimes blows in winter with the force of a hurricane. It is preceded by a fresh breeze from the southeastward, which rises after a calm and blows for several hours, accompanied by a sultry heat. The wind subsequently shifts suddenly to the southwestward and blows with great violence; the temperature falls and the barometer rises rapidly. Vessels anchored in the road or in the port should take all necessary precautions when the warm southeast wind sets in. Gales are most frequent in December.

**Batum Harbor.**—The port is situated on the western and southern sides of the bay.

A mole, 200 yards long and 60 yards wide, extends in a north-northeasterly direction from the northwestern extremity of Burun Tabia. It is proposed to extend this mole to 600 yards, and to dredge the space eastward of it to a depth of 24 feet and to construct a quay at its inner end having a depth of 22 feet alongside.

The Russian Steam Navigation Co. have a small mole situated near the customhouse.

The Petroleum Harbor is formed by a stone mole which extends from the south shore of the bay in a north-northwesterly direction for 275 yards. From its head one mole, called the Petroleum Mole, runs in a west by south direction for 440 yards. Another mole or

breakwater extends northeast by east for 275 yards. The western, or Petroleum Harbor, is dredged to a depth of from 24 to 30 feet. The eastern harbor, known as the Cabotage (Coasting Trade) Harbor, has a depth of from 7 to 17 feet. There are four mooring buoys in the western harbor.

There is a railway line on the Petroleum Mole; also, pipe lines for conveying petroleum to vessels alongside. The petroleum is brought from Baku in a conduit tube, 4 to 6 feet in diameter, which crosses the height of Surum between these places.

**Lights.**—An alternating red and white light, 28 feet above high water, visible white 10 miles, red 6 miles, is exhibited from a red quadrangular iron tower located on Cape Burum Tabia.

A fixed white light, 65 feet above high water, visible 13 miles, is exhibited from a white octagonal stone tower located northeast of Burum Tabia Fort.

**Harbor lights.**—A fixed green and red light, 37 feet above high water, visible 7 miles, is exhibited from a red quadrangular iron tower located on the head of the petroleum mole.

Two fixed red lights, 21 feet above high water, visible 5 miles, are exhibited from a post located on the Burum Tabia Mole.

**Anchorage.**—The importance of Batum as an anchorage arises from the fact of its being immensely superior to any other on the eastern shore of this sea as far as Kertch Strait, but its value is much lessened by the inconvenient depth for anchoring in, which on the western side of the bay is 20 fathoms 100 yards from the shore, quickly deepening to 30 and 35 fathoms.

Vessels anchor near the shore, in front of the town, in a depth of about 30 fathoms, and secure their sterns to bollards on shore by means of hawsers. The space there is very limited, and it is necessary when anchoring to guard against fouling the anchors of other vessels. When waiting for a berth to become vacant, vessels anchor on the edge of the bank northward of the Petroleum Harbor.

**Berthing regulations.**—On arrival at the port of Batum all steam and sailing vessels are to take up berths according to the indication of the port authorities, and no communication with the shore is allowed until all the customhouse and other necessary formalities have been completed.

All vessels, whether anchored in the roadstead or in the harbor, must have their anchors buoyed.

Vessels are allowed to make their moorings fast only to the permanent mooring posts and chains, and this without obstructing the landing places along the quays or the beach.

At the demand of the port authorities a master is bound to shift his moorings to neighboring mooring posts or chains, should neces-

sity arise, when another ship is being berthed, or for any other reason that may be deemed necessary.

Vessels, whether lying off the beach or at the quay, which shall not have commenced to load or discharge within 24 hours after all the formalities required by law have been completed, or which have discontinued such operations for a period exceeding 24 hours, must move away from the berth they occupy if at such time there be any other vessel awaiting their turn in the roads. At the same time all holidays and days on which no work can be carried on are not taken into account.

Should notice be given that a vessel which is lying in the roads is not ready to receive cargo when her turn for berthing comes round, she can only again come on turn (as a fresh arrival) upon notice of her readiness to load being handed in.

Immediately on completion of their loading operations from the shore, vessels are bound to move away from their beach or quay berths into the roads, and there continue to perform any further operations, in case such berths at the beach or the quay are required for other vessels.

Ocean-going steamers under the Russian flag which enter the harbor for the purpose of taking in Government stores are allowed to load and discharge their cargoes out of turn should the captain of the port so ordain.

All vessels while lying in the roads are obliged to exhibit the prescribed regulation lights from sunset to sunrise. This rule applies equally to coasting vessels, barges, lighters, and rafts.

In cases of fire or other disasters, whereby the safety of vessels or port property is endangered, all masters of vessels in the harbor, as also all boatmen and the railway authorities, are bound at the first call of the captain of the port to place at his disposal all available means and locomotives for rendering assistance.

Vessels in the harbor are prohibited from changing berths without the permission of the port authorities.

Steamers proceeding to and from the quays in the Petroleum Harbor are forbidden to move the engines, except in cases of extreme necessity, when permission will have to be obtained from the port office.

After the completion of the prescribed customs formalities, all vessels leaving the port must produce their papers to the captain of the port for permission to proceed to sea.

**Directions.**—In foggy weather it is recommended to approach Batum Bay from the southward, as the coast is high and abrupt and the lower part of the mountains can be seen when the summits are hidden. The muddy water discharged by the Chorokh River and the

beacon on the shore near its mouth also afford good marks for recognizing the position. A good berth should be given to Burun Tabia on account of the shoal extending westward from it.

Coming from the northward, on the contrary, the coast is flat and the fogs are low.

**Pilots.**—Pilotage is not compulsory, but no vessels enter or leave the port without a pilot.

**Repairs.**—The Batum Naphtha & Trading Co. executes small repairs to vessels and their machinery, and there is a floating crane capable of lifting 40 tons.

**Batum.**—The town of Batum, which stands on the western side of the bay, is unhealthily situated, being surrounded by the swamps of Kakhaber, which, although partly drained, are, from the rankness of the vegetation, the cause of fevers and agues, most prevalent between the months of June and October.

European buildings are gradually replacing the huts of the original Turkish village, which now occupies but a small portion of the town. There are numerous piers, public and private, near which are storehouses and the customhouse. The health office is situated near Burun Tabia. Eastward of the town, on the south shore of the bay, are the storehouses and factories connected with the petroleum industry.

There is no sailors' home. The sick are, by permission of the authorities, admitted to the town hospital. It has a population of about 30,000.

**Communication.**—Batum is the readiest point of internal communication with Georgia, Armenia, and Persia, and is a principal transit port. It is in railway and telegraphic communication with Tiflis, Poti, and Baku, from which latter place enormous quantities of petroleum are sent to Batum for shipment. By sea, several times weekly with Odessa and other Black Sea ports by the Russian company's steamers; and there are two regular passenger steamers between Batum, Constantinople, Trieste, and Marseilles. The steamers of the Ellerman and Moss lines from Liverpool also call regularly.

There is a railway to the military town (Voenni Gorodok), about 3 miles distant, where the barracks, arsenals, and magazines are situated, and from Tiflis a branch railway runs to Kars and Erivan.

**Lifeboat.**—There is a life-saving station with lifeboat on Burun Tabia.

**Storm signals** are hoisted on a special signal staff on the extremity of Burun Tabia.

**Coal and supplies.**—In normal times about 3,000 tons of Russian coal was usually kept in stock. Vessels coal alongside a quay in the harbor, where there is a depth of 26 feet. Petroleum waste is ex-

tensively used as fuel by the local steamers on the Black and Caspian Seas.

Fresh provisions were plentiful and cheap. Water is of good quality and is brought off in a tank boat.

**Quarantine.**—Vessels must remain in the road until pratique is granted.

**Coast.**—Westward of Būrun Tabia a bank of 5 fathoms and less fronts the shore and extends to about  $\frac{1}{4}$  mile. This bank is said to be extending. Vessels coming from the westward are recommended not to approach the shore within 1 mile.

**Gunieh.**—The lowlands, which are found near Batum, extend for 6 miles to the southwest beyond the mouths of the Chorokh River, of which they are the alluvions, and from their marshy nature they render the west side of Batum Bay very unhealthy from July to October. On the most southern of these mouths stands the town of Gunieh, which carries on a coasting trade. Southeastward of Gunieh is a large valley, through which the Chorokh River flows. Beyond the lowlands the mountains gradually approach the shore and are of considerable elevation, with white cliffs appearing at intervals.

**Beacon.**—A mast beacon, with three horizontal crosspieces as topmark, elevated 57 feet above the sea and painted red, is situated on the shore near the mouth of the Chorokh, about 4 miles southwestward of Batum, and is visible for about 8 miles. It is a useful landmark for vessels making Batum from the westward in thick or hazy weather.

**Boundary.**—The boundary between Russia and Turkey is situated about 12 miles to the southwestward of Batum.

## CHAPTER IX.

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### BLACK SEA—ANATOLIAN OR SOUTHERN SHORE; BATUM TO THE BOSPORUS.

**Anatolian coast.**—This coast is nearly devoid of ports or harbors, and those that exist are at a distance from each other and would offer no security to shipping were it not for the mountains neutralizing effect of the sea winds, which do not blow home. From this circumstance several anchorages afford shelter from tempestuous weather, although they have not a tempting appearance. Too much reliance must not, however, be placed on this observation as in certain localities the shelter of the hills is far from being so good as in others. The westerly winds are the most violent on this coast.

**Coast—Anchorages.**—From Batum Point the coast trends in a southwesterly direction for 43 miles to Kiz Kalessi. The anchorages of Makrialos, 7 miles south-southwestward of Gunieh, and 11 miles from Batum; of Kise, 8 miles beyond Makrialos; and of Sumla, 12 miles farther on, are all more or less exposed to westerly winds.

**Telegraph.**—A telegraph line follows the coast. There are stations at Khoppa and Arkhava, situated, respectively, 1 mile northeast and 5 miles southwest of Kise; also at Athina near Seidol.

**Seidol Road.**—The roadstead of Seidol is better and much used by coasters. It lies about 3 miles eastward of Kiz Kalessi, and 12 miles west-southwestward of Sumla, abreast Buleb, which is near Athina and a river of that name. A hill to the eastward, known to the natives as Eski Tarabozun (Old Trebizond), with three perpendicular sides, appears as a table-land covered with trees.

**Kiz Kalessi** (lat.  $41^{\circ} 12' N.$ , long.  $40^{\circ} 52' E.$ ) lies to the westward of Athina, and may easily be recognized by a bold rock on which are the ruins of an ancient castle.

**Coast.**—From Kiz Kalessi the coast trends southwestward for 6 miles to Kemer Point. From thence it continues in the same direction for 12 miles to Piriös Point. In this distance it recedes about 2 miles to the southward and is backed by very high mountains. The Askoros River empties into the sea 3 miles eastward of Piriös Point, and the coast between falls back 1 mile to the southward, forming the Bay of Rizeh.

**Piriös Point** is surrounded by a reef which extends  $\frac{1}{2}$  mile from the shore and a rock awash lies 700 yards  $281^{\circ}$  from its extremity

and about 300 yards from the shore. Between the point and the town there is a tower and two others on the beach to the eastward. A hill, also near the beach, has an old tower on its summit.

**Rizeh Bay (Rizo)** is 3 miles across from Askoros Point to Pirios Point and nearly 1 mile long. The town, which contains a population of about 14,000, is situated on the southern shore of the bay and on the rising ground behind it. The most conspicuous buildings are the governor's house, a white three-storied building; and the Russian vice consulate, also white and of three stories, situated on a hill. The greater part of the houses are built of wood.

The town, in contrast to others on this coast, is said to be very healthy; and the neighborhood is very productive.

**Rizeh Bay Light**, fixed red, 59 feet above high water, visible 6 miles, is located on Pirios Point.

**Anchorage.**—There is a depth of 3 fathoms over a sandy bottom about 200 yards from the shore, and 5 fathoms 600 yards. To the northward of the town, toward Pirios Point, the bottom is sand and shells, and no mud will be found till within  $\frac{1}{4}$  mile of the shore northeastward of the town. The anchorage is exposed to winds from northward of northwest, which raise a heavy sea in the bay and prevent communication with the shore.

Gales are prevalent from December to February. Vessels then proceed to sea, or else anchor in the eastern part of the bay. This anchorage is considered safe, and native sailing vessels winter there.

The current from the Askoros River, which sets in a westerly direction, attains in summer a velocity of about  $\frac{1}{2}$  knot. In the winter, in the eastern anchorage, this current is strong enough to keep vessels at anchor with the wind from west or northwest from tightening their cables.

**Communication.**—The steamers of the Russian Steam Navigation and other companies call at Rizeh when the weather permits. The roads from the town to the interior are not practicable for vehicles. A high road to Erzerum, via Ispir, is under construction. In winter snow prevents all communication. There are Turkish and Russian post offices, also a telegraph station. Messages for transmission must be in the Turkish language.

**Supplies.**—Water is abundant and good. It is brought to the town by pipes. The water from the Askoros River is equally good.

**Surmena Bay.**—Cape Fidji lies 6 miles 258° from Pirios Point and Cape Ereklia, nearly 14 miles 258° from Cape Fidji. The coast falls back about 3 miles between these capes, forming Surmena Bay, in which the water is also deep, but temporary anchorage may be found in the western portion of the bay. The locality, however, being extremely malarious, owing to adjacent marshes, is to be



avoided during the summer season. There is a good landing in Surmena Bay in fine weather on a beach  $1\frac{1}{4}$  miles in length, but exposed to northerly winds. There is a manganese mine near Surmena.

**Gavgos**, a fishing village, situated  $1\frac{1}{4}$  miles westward of Cape Ereklia, at the mouth of the Yamboli River, has sheltered landing on a beach nearly  $\frac{1}{2}$  mile long.

**Kovata Road.**—From Cape Ereklia the coast trends 3 miles westward to Falko Point. From thence it again curves southward, forming a bay eastward of Kovata Point, which lies 7 miles  $281^{\circ}$  of Falko Point. The roadstead of Kovata, which affords shelter from westerly winds, is abreast the Drono River, which empties into the sea 2 miles southeastward of Kovata Point. There is a sandy beach, suitable for landing in fine weather, at Yomura village, situated at the mouth of the Drono.

From Kovata Point the coast runs  $295^{\circ}$  for nearly 3 miles to Khopsi Point, between which and Kalmek Point, 2 miles to the westward, is the Bay of Trebizond, or Tarabozun, of the Turks.

**Trebizond.**—The town of Trebizond is built on a rocky tableland sloping somewhat toward the sea, and the citadel commands the town and anchorage. It may be recognized by Boz Tepe, 800 feet high, rising behind it, on the side of which is a Dervish monastery, a large building surrounded by walls.

The town, which has a population of about 45,000, is subject to malarious fever, caused by the marshes in the neighborhood. Admission to the civil and military hospital is given to sailors. The Moslem population live chiefly in the old walled town and westward toward St. Sophia; the foreign and business quarter is to the eastward.

**Communication.**—There is constant communication with Constantinople, Odessa, and Poti by vessels of the Russian Steam Navigation and other companies; steam communication fortnightly by the Messageries Maritimes Co.'s steamers with London and Marseilles; and with Liverpool by the Moss and Ellerman Lines. In addition, there are regular services of steamers to other Black Sea ports, and telegraphic communication with Erzerum, also with Constantinople, Batum, and all parts. There are Turkish, Russian, French, and Austrian port offices in the town.

**Supplies.**—Good water can be obtained from Deghirmen Rivulet by boats furnished with hoses. Coal is not kept in stock for supplying shipping.

**Kalmek Point**, the northwest extremity of the anchorage of Trebizond, affords protection from westerly winds. Rocks extend off it to the northward about 70 yards. A battery, a lighthouse, and other buildings stand on the point.

**Trebizond Light**, flashing white, 105 feet above high water, visible 16 miles, is exhibited from a white stone tower located on Kalmek Point between the two embrasures.

**Port.**—A mole 150 yards in length, which extends in an easterly direction from Kalmek Point, affords loading and shelter to small craft. A breakwater, to extend 400 yards in a northerly direction from Eleusa Point, is under construction; about 200 yards are already completed. It is proposed to extend the Kalmek Point Mole another 300 yards to the eastward, thus forming a harbor, the entrance to which, between the breakwater and the mole, will be about 300 yards wide.

**Anchorage.**—The roadstead is eastward of Kalmek Point, and in strong westerly winds only affords fair anchorage to small craft under the shelter of the mole. Vessels load by means of lighters carrying from 25 to 30 tons.

The best anchorage is with Kalmek Point, bearing about  $292^{\circ} \frac{1}{2}$  mile in 5 to 7 fathoms, with good holding ground of mud and sand, and just clear to the eastward of some high land, which causes the land wind in fine nights to come off in strong gusts. It is advisable to moor with an open hawse to the northward, the anchors laid well apart, and a good hawser and stream anchor out astern. The wind is so variable here, coming off the land every night, that if a vessel swings she will be continually broadside to the swell, and run the risk, from perpetual changes, of loosening her anchors in the ground, besides the difficulty of keeping a clear hawse. She may hang by her stern anchor without any fear, and at the commencement of a gale from the northwest the hawser can be veered to allow her to come head to wind. The breeze will soon be over, when it should be hove in again to keep the swell from the northward right ahead.

Small vessels anchor in the bight of the bay close under Kalmek Point, in 2 to 4 fathoms, partly sheltered by the breakwater.

The bottom of the bay is fronted by a beach; and to the eastward of Eleusa Point, near the ruined castle in the bay, there is another beach bordering the entrance of Deghirmen Valley. A rivulet runs into the sea here, over which is a stone bridge with several arches.

**Landing** during a heavy swell is very difficult. On these occasions a shore boat should be used, the crew of which run the boat up on the beach south of the customhouse. In fine weather the landing place is at the customhouse jetty, where there is sufficient water for boats to lie.

**Winds.**—The prevailing winds at Trebizond are from the southward. Easterly winds, and in summer, northerly and northwesterly winds, however, blow ordinarily during the day. Northwesterly winds are of short duration, but are sometimes very violent and raise a heavy sea in the bay.

The appearance of Cape Ieros gives a good indication of the probable weather. If the cape be free from clouds and clearly visible, fine weather may be expected. If the cape be covered with clouds, the weather will most likely become bad.

**Platana** is a town having a population of about 10,000, lying 7 miles to the westward of Trebizond. Its roadstead is good and is often resorted to by vessels trading with Trebizond, it being sometimes possible to discharge cargo and land passengers when they can not do so at that place. It is also a good winter anchorage, secure against the sea winds, notwithstanding it is exposed from north-northwest to east. There is a beach of loose sand opposite the town nearly  $\frac{1}{2}$  mile long, at the eastern end of which are several warehouses.

**Anchorage.**—The anchorage is in a depth of 10 to 15 fathoms, about  $\frac{1}{2}$  mile from the town. Vessels moor with open hawse toward the shore as the land winds are violent. From the depth of 25 fathoms, which will be found  $\frac{3}{4}$  mile north-northeast of the town, the water shoals gradually to 5 fathoms, over sand and mud, 300 yards from the shore.

**Sargana Point** lies  $1\frac{1}{2}$  miles  $326^\circ$  of the town and is bordered by rocks extending about 200 yards from the shore. The coast from thence trends northwestward for 5 miles to Zeitun Point, which forms the eastern angle of the broad promontory of which Cape Ieros is the western.

**Cape Ieros**, nearly 4 miles westward of Zeitun Point, forms a useful landmark for vessels bound to Trebizond, as it projects to the northward, has several white patches in its vicinity, and a lighthouse 120 yards within its extremity. Its shores are irregular, of a reddish tint, and a conical hill rises at its extremity.

**Cape Ieros Light**, flashing white, 98 feet above high water, visible 16 miles, is located 120 yards from the extremity of the cape.

**Zeitun Point—Anchorage.**—Westward of Cape Ieros the coast trends to the southwestward, and thence northwestward to another Zeitun Point  $10\frac{1}{2}$  miles from Cape Ieros, forming a bay in which there is good anchorage abreast of Chesmeh Rivulet, sheltered from west round by south to east by north.

**Kureli and Kara Points.**—Kureli Point is a low projection of the coast 2 miles  $281^\circ$  of Zeitun Point. Kara Point is also low, and lies 10 miles westward of Kureli Point.

**Tereboli (Tripoli).**—This town stands on three small points, which form two coves  $5\frac{1}{2}$  miles  $247^\circ$  from Kara Point. It has a population of about 5,000. The western cove is full of rocks, but the other carries a depth of 3 fathoms and will contain 5 or 6 coasters. It is, however, exposed to northerly winds. The best anchorage is in the roadstead northeastward of the town, abreast Khalka<sup>a</sup> Vala Beach, in 8 to 10 fathoms.

**Tereboli Light**, flashing white, 79 feet above high water, visible 10 miles, is located on the extremity of the easternmost of the three points.

**Communication.**—Russian and Turkish steamers, also those of the Austrian Lloyd Co., touch at Tereboli. There is a telegraph station. Messages for transmission must be in the Turkish language.

**Furun Islets.**—Two rocky islets, named Furun, lie abreast a projection of the coast 2 miles  $247^{\circ}$  of Tereboli.

A shoal, with a depth of 5 feet over it, is reported to lie 200 yards northward of the western islet.

**Zephyr Bay.**—Cape Zephyros bears  $258^{\circ}$  6 miles from Furun Islets, and between them the coast falls back 2 miles to the southward, forming Zephyr Bay. Zephyros village stands on its western shore, and the anchorage is abreast of it in from 5 to 10 fathoms, over sand and mud, and sheltered from  $315^{\circ}$  round by south to  $67^{\circ}$ . Toward the cape the shore is bordered by a rocky ledge which generally breaks.

**Kerasunda (Kerassond).**—This town, situated 10 miles  $247^{\circ}$  of Cape Zephyros, on a promontory projecting to the northward from the foot of the mountains, has a population of about 18,500.

**Communication.**—The steamers of the Russian Steam Navigation Co. between Odessa and Batum call every fortnight, and those of the Austrian Lloyd Co. between Constantinople and Batum call once a week. The steamers of the Ellerman and Moss Lines from Liverpool call occasionally. There is telegraphic communication.

**Supplies.**—Water is abundant and good.

**Dangers.**—**Palamida Reef**, which is awash, lies  $\frac{1}{2}$  mile  $22^{\circ}$  from the northern extremity of the promontory, and **Kior Tam Bank**, about 300 yards in extent, consisting of several rocky heads, one of which is awash, lies 400 yards southward of it. Depths of 12 fathoms occur between this bank and Palamida Reef, and from 5 to 7 fathoms between it and the shore. It is not advisable to pass within  $\frac{1}{2}$  mile northward of Palamida Reef.

From a point on the western side of the promontory of Kerasunda, a reef, formed by the remains of an ancient mole, projects in a westerly direction for 350 yards. A Greek church, with spire, stands on this point.

None of these dangers are buoyed.

**Kerasunda Light**, two fixed white, 194 feet above high water, visible 12 miles, is exhibited from a mast on a white house located on the northeast part of the point.

**Anchorage.**—Coasters anchor in Demir-kapi Bight, eastward of the promontory, a little distance from the shore, in 12 or 13 fathoms water, sheltered from west to northwest, but exposed to northerly

winds when the surf is violent. There is better anchorage farther offshore in 16 fathoms, where one anchor will be sufficient.

About 1 mile to the eastward of Demir-kapi there is a projecting point bordered with rocks, to the eastward of which is Pugachik Bight, where there is anchorage for coasters, in 10 or 12 fathoms, not far from the shore, sheltered, as at Demir-kapi, from west and northwest winds, and having Puga Islet 1 mile to the northeastward, the additional shelter afforded by which makes this bight a good winter anchorage for three or four coasters if moored.

There is also anchorage in the bay close westward of Kerasunda Promontory, named Lonja, or the Bazaar, in 8 to 10 fathoms, but it is exposed to westerly winds, and, with all its faults, that of Demir-kapi is to be preferred. Lonja Anchorage is, however, the one used by the steamers that call at Kerasunda, and the usual landing place and the customhouse are on this side of the promontory.

Vessels sometimes anchor in the roads to the westward of Lonja off the mouth of the Batlama River in about 20 fathoms water.

**Cape St. Basili** is fringed by rocks, and lies 5 miles  $281^{\circ}$  from Kerasunda.

**Shoal.**—Along the coast westward of Cape St. Basili, a shoal of 13 feet water has been reported, which in some parts extends more than 1 mile from the shore.

**Ordu.**—The coast from Cape Basili runs nearly in a direct line for 20 miles  $281^{\circ}$ , with occasional beaches, as far as the town of Ordu, which may be recognized by Mount Bos Tepesi, close northwestward of it, which forms a promontory projecting to the northeastward, between the beach of Melet and that of Pershembi. Some manganese mines are working in the vicinity of the town, one being situated at Bos Tepesi.

The town contains a population of about 7,500.

**Communication.**—Steamers of several lines trading in the Black Sea touch at Ordu. Telegrams are only accepted for transmission when in the Turkish language.

**Anchorage.**—The roadstead of Ordu is good, with depths of from 10 to 5 fathoms, over mud and sand, sheltered from westerly winds, but exposed to those from between north and east.

**Vona Bay.**—At the northeastern extremity of Bos Tepesi Promontory, there is a steep rock, named Buzuk Kale, separating Ordu and Pershembi Bays. From Buzuk Kale the coast trends westward and northwestward, forming Vona Bay, to Vona Point, which bears  $331^{\circ}$ , 6 miles from Buzuk Kale. Vona Bay affords the best anchorages on this coast, and though exposed to winds from north to east-southeast, little is to be feared from them as they rarely blow home. The land winds, however, are violent, and must be guarded against.

Many of the vessels belonging to the Anatolian coast, having to winter in the Black Sea, resort to this bay.

**Vona Point Light**, group flashing white, 120 feet above high water, visible 12 miles, is exhibited from a white iron column located 54 yards from the extremity of the cape.

**Anchorage.**—In the southern part of Vona Bay there is anchorage in Pershembı Bight, which is rendered conspicuous by an extensive beach bordering the shore between it and Buzuk Kale. About 600 yards from the shore there is a depth of 5 fathoms, sand and shells, which gradually increases to 20 fathoms 1,600 yards from the coast, over a bottom of sand mixed with mud. The anchorages, however, abreast Agsi,  $2\frac{1}{2}$  miles northward of Pershembı; of Keshalah,  $\frac{3}{4}$  mile to the northward of Agsi; and Chesmeh,  $1\frac{1}{4}$  miles southward of Vona Point, are much to be preferred. That of Chesmeh is considered the best, there being a depth of 10 fathoms, over sand and mud, with a good holding ground,  $\frac{1}{4}$  mile from the shore.

**Cape Yasun** lies  $5\frac{1}{2}$  miles  $281^\circ$  from Vona Point, and between them the coast falls back 1 mile to the southward, affording an anchorage sheltered from east (through south) and west winds. The cape, with a monastery on it, is low, and projects to the northward in the form of a glacis. Khanet Kalessi, a small islet, with a tower, lies near the shore 2 miles westward of Vona Point.

**Shoal.**—A shoal with a depth of 13 feet over it is reported to exist  $\frac{3}{4}$  mile to the northward of the monastery on Cape Yasun.

**Fatsa Bay and Reef.**—From Cape Yasun the coast turns abruptly to the southwestward for 7 miles, and then curves round to the westward to Karejik Point, which is  $10\frac{1}{2}$  miles  $230^\circ$  from the cape, forming Fatsa Bay, which takes its name from the small town on the western shore. Fatsa Reef lies 1 mile eastward of Karejik Point, and is about 1,200 yards in extent, with 12 fathoms to the northward of it. A rock, the remains of an old breakwater, is reported to exist midway between Fatsa Reef and Karejik Point. Mariners are, therefore, cautioned not to use the channel westward of Fatsa Reef. Few vessels frequent this bay as it is open to the northward and deep, having from 13 to 30 fathoms close to the shore.

The town contains a population of about 3,000, and has a small trade in eggs and nuts. There is a short broken-down landing stage, but landing is mostly effected on the open beach. There is a telegraph station at Fatsa.

**Fatsa Bay Light**, flashing white, 20 feet above high water, visible 5 miles, is exhibited from a white iron column located on Fatsa Reef.

**Tashkana Point** (lat.  $41^\circ 8' N.$ , long.  $37^\circ 9' E.$ ), which bears nearly due west, 17 miles from Cape Yasun, is bordered by a reef, which extends about 200 yards from the shore, and has a depth of 5

fathoms about  $\frac{1}{2}$  mile from it. About  $\frac{1}{2}$  mile westward of Tashkana Point, and close to the shore, there is a small islet, with a church on it dedicated to St. Nikolo. On the eastern side of the point is Unieh Bay.

**Unieh (Uniah).**—This town (ancient Enoe), built in the shape of an amphitheater, on the eastern declivity of Tashkana Point, has a handsome appearance, being backed by a range of wooded mountains. The houses are chiefly of wood, and those nearest the sea are erected on stone piers or pillars. The population numbers 12,000 and is composed mostly of Greeks, who carry on a considerable and increasing traffic with Constantinople and the Crimea. There is a small pier near the customhouse, but landing is usually effected on the open beach.

There is a telegraph station in the town.

**Anchorage.**—The anchorage abreast the town is in 5 or 6 fathoms, mud and sand, about  $\frac{3}{4}$  mile from the shore. The depths from this position decrease gradually to the town, over a sandy bottom. A vessel should moor with open hawse to the northeast, as the winds from that quarter are dangerous.

**Tashkana Point Light**, group flashing white, 62 feet above high water, visible 10 miles, is exhibited from a white iron column located north of Unieh village.

**Chaldi Point—Anchorage.**—From Tashkana Point the shore becomes low and wooded, trending westward and northward to Chaldi Point, which lies 16 miles  $203^{\circ}$ . There is a good anchorage, in 4 or 5 fathoms, over a mud bottom, abreast of the Termeh River which empties into the sea nearly 4 miles to the southward of Chaldi Point, but it is exposed to northeasterly winds.

**Iris Point (Chiva Burnu)** (lat.  $41^{\circ} 21' N.$ , long.  $36^{\circ} 39' E.$ ).—The coast from Chaldi Point still continues low and wooded, trending 17 miles  $281^{\circ}$  to Iris Point (Chiva Burnu). From thence it turns southward and westward to Kalion Point, which lies 14 miles  $258^{\circ}$  from Iris Point and forms Samsun Bay. The Yeshil Irmak (ancient Iris) empties into the sea 3 miles southwestward of Iris Point.

**Chiva (Iris) Point Light**, group flashing white, 75 feet above high water, visible 14 miles, is exhibited from a white skeleton iron tower located on the point.

**Shoals.**—Between Chaldi and Iris Points there are shoals, some of which are reported to extend more than 300 yards from the shore; and at the distance of about 1 mile from the coast the depths are variable, with not more than  $3\frac{1}{4}$  to  $3\frac{3}{4}$  fathoms in some places.

The depth of water off Iris Point is decreasing, there being, in the year 1898, only  $4\frac{1}{4}$  fathoms at a distance of 2 miles northward of the point.

**Samsun Bay.**—**Kalion Point** (lat.  $41^{\circ} 19' N.$ , long.  $36^{\circ} 21' E.$ ), which forms the northern extreme of Samsun Bay, is low and remarkable for its brownish appearance. The town of Samsun is situated nearly 1 mile southward of it. A battery stands on Kalion Point, and to the westward may be seen two conical summits of the Nebiene Mountains. The point is bordered by sunken rocks, or the remains of a mole, extending nearly 600 yards offshore, on which the sea breaks heavily at times. There are also several rocks along the shore bordering the town, which makes it sometimes dangerous for boats to approach it in rough weather, but toward the battery southward of the town the shore is clean.

**Samsun Bay Light**, fixed white, 56 feet above high water, visible 12 miles, is exhibited from a white stone tower located on Kalion Point.

**Anchorage.**—Vessels anchor abreast the town in any convenient depth, as there are 3 fathoms, sand,  $\frac{1}{4}$  mile, and 6 fathoms, mud,  $\frac{1}{2}$  mile from the shore. But this anchorage is only good in summer, as northerly and northeasterly winds make it dangerous during the winter months. A heavy swell generally sets in, which renders it difficult to ship and land goods, yet it is done in a very expeditious manner, and a flourishing trade exists.

**Piers.**—There is an iron pier, 160 feet in length, for the use of the customhouse; also other piers, from 100 to 250 feet in length, situated along the shore, some of which are provided with cranes.

**Town.**—The town of Samsun (ancient Amisus), which is the port of the caravan route to Baghdad and the principal commercial center, after Trebizond, on the Anatolian coast, contains a population about 12,000, consisting chiefly of Turks and Greeks. It is unhealthy, owing to the marshes in its vicinity. There is a large hospital in the town.

Between the northern end of the town and Kalion Point is a strip of land, partly marsh and partly gardens, which is said to be full of sewage. Landing on this part of the beach should therefore be avoided.

**Communication.**—There is communication fortnightly by the steamers with London and Marseille, and four times weekly and three times fortnightly by steamer to the most important ports up and down the coast. The steamers from Liverpool call occasionally. A railway between Samsun and Diarbekir is proposed.

Telegrams are accepted for transmission in most European languages. There are Turkish, Russian, and Austrian post offices in the town.

**Supplies.**—Water is difficult to obtain, there being no tank boats for bringing it off. It is also very muddy.



**Kumjugaz Road.**—Westward of Kalion Point there is a long beach, followed by lowlands covered with trees, trending northwestward for 14 miles, to the roadstead of Kumjugaz, which is well spoken of, and lies abreast of the mouth of a large lake. There is a depth of 5 and 6 fathoms over a muddy bottom from 1 to  $1\frac{1}{2}$  miles from the shore, but the anchorage is exposed to winds from north to east-southeast. All this coast is clean, having a depth of 10 fathoms  $1\frac{1}{2}$  to 3 miles from it.

**Halys Point (Cape Bafra).**—Injir Point lies 7 miles due north of Kumjugaz, and from thence the coast trends northwestward for 11 miles to Halys Point, or Cape Bafra, which is low and covered with trees, and where the Kizil Irmak (ancient Halys) empties into the sea by two mouths, forming an islet between them.

**Cape Bafra (Halys Point) Light,** flashing white, 82 feet above high water, visible 14 miles, is exhibited from a white skeleton iron tower located on the north extremity of the island.

**Coast.**—Westward of Halys Point the coast trends west by south for 18 miles, and is low and wooded. Thence in a northwest direction the coast is bordered by mountains as far as Cape Sinub; the bay between, which is 39 miles across and nearly 15 miles deep; in the northwest corner lies the town of Sinub.

**Gherzeh.**—This little town (ancient Carusa) stands on a low point at the foot of a high mountain, about 13 miles southward of Sinub. A reef extends about 200 yards east-southeast of the point. Rocks also border the shore of the town to the distance of 100 yards.

There is a telegraph station in the town.

**Anchorage.**—The anchorage in this roadstead, in 5 to 7 fathoms, mud and sand, about 800 yards from the shore, is said to be safe. A small vessel anchored in 3 fathoms, mud and shells, about 400 yards southward of the town, will be sheltered by the point from north and northeast winds.

**Cape Sinub** is the northeast extremity of the peninsula of Boztepe, which projects about 3 miles to the eastward from a narrow isthmus connecting it with the mainland and on which stands the town of Sinub (ancient Sinope). In whatever direction the cape is approached, it may be easily recognized by the peculiar form of the peninsula, the summit of which is flat and the sides steep, except toward the isthmus. The isthmus is scarcely visible from a distance, so that the peninsula will make as an island.

**Boztepe Point.**—A conspicuous rock lies about 400 yards northeastward of Boztepe Point, the southeastern extreme of the peninsula. The rock is steep-to, with 14 to 19 fathoms water between it and the point. The northern shores of the peninsula are clean, but a vessel in running, or turning to windward, along the southern shore must not approach within 200 yards.

The only landing place on the south side of the peninsula is at the ravine below the village of Ada Kioi.

**Sinub (Sinope) Light**, fixed white, 344 feet above high water, visible 12 miles, is exhibited from a white stone tower located on Boztepe Point.

**Sinub (Sinope).**—This town, formerly the capital of Pontus, is divided into two distinct parts. The first, the fortress, the walls of which are washed by the sea, is built on the isthmus and inhabited by Turks. The second stands on the slope of the peninsula and is the residence of the Christians, composed mostly of Greeks. It has a population of about 8,000. The governor of the district resides here.

**Anchorage.**—The roadstead enjoys a good reputation, even in winter, and is the safest anchorage between the Bosphorus and Batum. Vessels anchor in 5 to 10 fathoms, mud and sand, from 200 to 800 yards southward of the town, quite sheltered from westerly and northeasterly gales. The shore can be approached to the depth of 3 fathoms, but off the town the bottom is foul with the remains of ancient jetties.

**Communication.**—There is weekly steam communication with Constantinople and the various ports on this coast. Turkish steamers to and from Constantinople call at irregular intervals. Telegrams are accepted for transmission in either French or Turkish.

**Ak Liman.**—This little port (ancient Armene) lies 5 miles west-northwest of Sinub at the extremity of a low and sandy shore, which is backed by mountains bordered by white rocks. It is about  $\frac{1}{2}$  mile long in a northwest and southeast direction and is about 800 yards wide in its widest part, but the entrance is narrowed to  $\frac{1}{4}$  mile by two islets which lie off the points. That to the northward is bordered by rocks, but the southern islet has a depth of 3 fathoms close to it. The port, which is open to the eastward, has from 5 to 7 fathoms at a little distance within the entrance. Nearer the bottom of the port there is a depth of 2 and 3 fathoms, in the northern part of which vessels of light draft will find shelter from all sea winds, with 2 fathoms water 300 yards from the shore. There is a landing place on the southern shore.

**Coast—Reef.**—Beyond Ak Liman the coast becomes bold and rocky, and trends north-northwest for 3 miles, forming three points, the northern of which is Pakhios Point. About 1 mile north of Ak Liman is a reef  $\frac{1}{2}$  mile from the shore. From Pakhios Point the coast trends westward to Cape Injeh, which is 3 miles.

**Cape Injeh** (lat.  $42^{\circ} 6' N.$ , long.  $34^{\circ} 58' E.$ ) and Pakhios Point, the most northern points of Anatolia, are of a reddish tint and free from danger. The cape is flat and resembles a bastion. Capes Injeh and Sinub form a remarkable feature of the coast, dividing the eastern and western parts of Anatolia.

**Cape Injeh Light**, fixed and flashing white, 92 feet above high water, visible 14 miles, is exhibited from a white stone tower located near the extremity of the cape.

**Kuildi Reef**.—From Cape Injeh the coast turns abruptly to the southward and southwestward, whence it takes a westerly direction to Cape Kerempeh, which bears  $267^{\circ}$ , 76 miles from Cape Injeh. A bed of rocks, named Kuildi, about 2 miles in length from east to west and a good  $\frac{1}{2}$  mile in breadth, lies 13 miles southwestward from Cape Injeh. Its outer edge is about 1 mile from the coast. Its eastern end is off the Valley of Kaza-kildi, which is covered with buildings, and another inhabited valley is nearly abreast of the shoal.

**Stefano Point—Anchorage**.—Stefano Point is a small projection of the coast, lying 21 miles to the westward of Cape Injeh. There is anchorage abreast of the town, which stands eastward of the point, sheltered from west and northwest winds, but open to the northeast. The depths are from 3 to 5 fathoms, sand and mud.

**Antonios Point—Anchorage**.—Antonios Point, situated  $6\frac{1}{2}$  miles westward of Stefano Point, has some buildings and a rivulet eastward of it. The anchorage is to the eastward of the rivulet in 3 or 4 fathoms, mud and sand, but it is exposed to all winds from seaward.

**Apana**.—From Antonios Point the coast takes a westerly direction for 8 miles to Kinogly Point, off which rocks extend to the northeastward. Thence the coast continues in the same direction to Apana, 8 miles, off which coasters sometimes anchor, abreast of the village and rivulet.

**Ineboli (Niopoli)**.—Ineboli, a low projecting point, is situated  $11\frac{1}{2}$  miles westward of Apana. Off it a reef extends some distance, forming a roadstead to the eastward, abreast of the town of Ineboli. Here vessels anchor in 3 or 4 fathoms, muddy bottom. Vessels may enter the road during the night but are not granted pratique after sunset.

**Cape Ineboli Light**, two fixed white, 85 feet above high water, visible 10 miles, is exhibited from an iron mast located on the summit of the point.

**The town** of Ineboli, which stands on the southern shore of the roadstead at the mouth of a ravine spanned by a girder footbridge, has a population of about 9,000. There is a military hospital to which seamen are admitted. A breakwater has been recently completed, and there is a pier and a wharf where boats can land, with a depth of from 7 to 8 feet alongside.

**Communication**.—The steamers of the various lines running between Constantinople and Batum couch at the port. There is also telegraphic communication. The town contains Turkish, Russian, French, and Austrian post offices.

**Cape Kerempeh**, situated 22 miles  $281^{\circ}$  from Ineboli, is the western termination of the most prominent land of the Anatolian coast, of which Sinub is the eastern extreme. This cape, one of the highest in the Black Sea, is bordered by reddish cliffs and may be easily recognized by vessels coming from the Crimea, from which it is 140 miles. These two promontories divide the Black Sea into two parts, the eastern and western, which are often very distinct, by the different winds blowing at the same time in each. Cape Kerempeh is much dreaded by the coasters from the severe tempests which often occur in its vicinity.

**Cape Kerempeh Light**, alternating flashing white and red, 410 feet above high water, visible 20 miles, is located 110 yards from the end of the cape.

**Coast.**—From Cape Kerempeh the coast is safe to approach. It trends in a general west-southwest direction for 95 miles to Cape Baba.

**Kara-Agatch.**—The village of Kara-Agatch, where formerly vessels of considerable size were built, lies 14 miles from Cape Kerempeh. The anchorage, which is exposed to westerly winds, is only used by coasters. Fulo Mountain lies  $3\frac{1}{2}$  miles to the southeastward.

**Kidros.**—The little port of Kidros,  $4\frac{1}{2}$  miles westward of Kara-Agatch, is backed by a mountain in the form of a sugar loaf, which assists in identifying it. The port will accommodate 5 or 6 vessels in 3 to 4 fathoms, but it is exposed to northerly winds. In entering keep the eastern shore aboard, to avoid a rock which obstructs and considerably narrows the entrance.

**Amastra** (lat.  $41^{\circ} 45' N.$ , long.  $32^{\circ} 25' E.$ ).—Amastra Bay, 23 miles to the westward of Kidros, is formed between Chakras and the town of Amastra (ancient Amastris), which appears at a distance like a group of islets. The town stands on a double peninsula, the eastern part of which is  $\frac{1}{4}$  mile in length from east to west, connected with the mainland by a low sandy isthmus about 125 yards in breadth. The western part is joined to the eastern by a narrow bar, over which the sea breaks in heavy weather and northward of which is a shoal close to the shore. About 200 yards northward of the eastern peninsula there is an islet, 340 yards in length from north to south, of moderate height and with bold yellow shores. Between it and the town there is a depth of 10 fathoms.

The town contains a population of about 2,500. The trade is inconsiderable.

**Amastra Light**, flashing white, 312 feet above high water, visible 16 miles, is exhibited from a stone tower located on the summit of the peninsula.

**Anchorage.**—The best anchorage, about 600 yards in extent, is that southeastward of the town, abreast of the isthmus, in 8 to 3

fathoms, sandy bottom, protected to the northward by an islet, which is connected to the peninsula by rocks. A reef extends 200 yards eastward of the point of the islet, which serves to break the force of the sea with northerly winds. On the southern shore of this anchorage, off two points 600 and 1,000 yards eastward of the peninsula, shoals extend 200 yards, and are said to be the remains of ancient jetties; but the eastern portion of Amastra Bay is clean, having from 4 to 10 fathoms close to the shore, over sand and mud.

A cove, 200 yards in length, lies westward of the isthmus, but the anchorage is inferior to the eastern one and exposed to westerly winds. The entrance, 200 yards in breadth, is much narrowed by rocks which fringe the northern and southern shores. It has from 8 to 2 fathoms over a sandy bottom. The commerce of this place is inconsiderable.

**Coast—Bartheni River.**—The Bartheni River reaches the sea  $7\frac{1}{2}$  miles to the westward of Amastra and near a point of the same name. There is a depth of 3 fathoms near the shore, and 8 feet on the sand bar at the mouth of the river, the channel over which is narrowed by rocks on both sides. The river is available for coasters as far as Bartheni, which is situated 2 miles from its mouth.

Ghizelji Hissar is a slight projection of the coast 6 miles southwestward of Bartheni Point, and between it and Philios Point, which lies nearly 8 miles farther on, there is a beach 6 miles in length. Kilimoli Point, which projects a little from the coast, is high, and lies 4 miles to the westward of Philios Point, the coast between them receding slightly to the westward.

**Sungul (Zonguldak) Bay**, although open to the north and west, affords fairly good anchorage in about 13 fathoms, sand, and mud, over rocks, and well protected from northeasterly winds.

**Harbor.**—There is an artificial harbor in the northern part of the bay, protected by a breakwater 330 yards in length, within which are depths of 5 to 7 fathoms.

**Regulations.**—Vessels desirous of entering the harbor must, as soon as they are within sufficient distance to be seen, hoist at the masthead a rectangular flag colored vertically half red and half white with the white to the mast.

**Shoal.**—A rock, with a depth of 4 feet over it, is situated on the eastern side of the harbor 100 yards southwestward from the end of the pier near the quarantine station. It is marked by a red flag.

**Sungul Light**, flashing white, 167 feet above high water, visible 10 miles, is exhibited from a white wooden tower located on the point.

A fixed red and white light is exhibited from the mole.

**Buoys.**—There are two mooring buoys laid down in the entrance to the harbor.

**Pilots.**—The Heraclea Co. send a boat to vessels arriving with a competent pilot who will berth them at the quay or take them to an anchorage where coaling can be carried out.

**Tugs.**—There are two tugs stationed at Sungul Bay.

**Town.**—The town of Sungul is situated on the eastern shore of the bay.

**Communication.**—There is a telegraph office in the town; also Turkish, French, and Austrian post offices.

**Coal and supplies.**—There are berths for two steamers alongside the breakwater, in a depth of 25 to 27 feet, where there are two steam cranes, which will load from 80 to 100 tons of coal per hour, and a transporter which will load a vessel at the rate of 200 tons per hour, the railway trucks being lowered into the vessel's hold. Vessels can also lie on the opposite side of the harbor at a pier near the quarantine station, where there is a depth of 25 feet, under a steam crane. Rough weather prevents coaling alongside.

**Koslu Bay.**—The locality of Koslu Bay, which lies about 2 miles southwestward of Sungul Bay, is best distinguished by the houses near the shore. The land about it presents no remarkable object, the coast being generally bordered by high mountains covered with forests.

**Anchorage.**—The bay affords a summer anchorage for steamers and coasters. Traders resort to it in May and later for the shipment of coal, anchoring northeastward of the valley to get better shelter from the point, the wind being generally to the eastward of northeast. The bottom is sand under the depth of 12 fathoms, with mud and sand in deeper water. The western extreme of the land, kept open of Alesso Point, will lead to a good berth  $\frac{1}{4}$  mile from the shore, but to expedite the embarkation of coal, a nearer berth may be taken.

**Coal.**—Koslu Valley is one of the principal localities for coal mining in the Heraclea Basin, the other mining centers being Chatal Aghzi, Kilimli, and Sungul Valleys to the northeastward, and Chamli and Khandilli Valleys, near Bender Erekli, to the southwestward. The coal resembles Newcastle coal in quality and appearance.

It is shipped at Koslu into lighters from a small pier, alongside which there is a depth of 11 feet. From 600 to 700 tons can be loaded in a day when the weather is favorable.

At Chatal Aghzi and Kilimli the coal is loaded into lighters and towed round to Sungul Bay for shipment.

**Bender Erekli Bay—Cape Baba.**—From Koslu Bay the coast trends 17 miles  $241^{\circ}$  to the promontory of Cape Baba, which is faced with rocky cliffs and rendered remarkable by the sunken change in the aspect of the coast southward of it.

Southeastward of the cape is the Bay of Bender Erekli, which is about  $2\frac{1}{2}$  miles in length from Cape Baba to Kara Sakal, its southern point, with a depth in the middle of 7 fathoms, over sand and mud, shoaling gradually to the shore.

**Evlidge Burnu Light**, group flashing white, 252 feet above high water, visible 15 miles, is exhibited from a white masonry tower located on the western side of Kisi Agsi Bay.

**Cape Baba Light**, fixed red, 78 feet above high water, visible 5 miles, is exhibited from a white mast on a house with a red roof located on the south side of the cape.

**Anchorage.**—There is a depth of 4 fathoms 400 yards southeastward of the mole, 200 yards from the shore, where small vessels may anchor, sheltered from  $292^{\circ}$  round by north to  $191^{\circ}$ ; but the anchorage northwest of the mole, between the town and Cape Baba, is to be preferred. Here small vessels may lie sheltered from westerly winds in 3 or 4 fathoms, over mud and sand. The southwest winds are not dangerous as they seldom blow home; and the coast not being far off in that direction, the fetch of the sea is not great. The anchorage for larger vessels is in about 6 fathoms, 800 yards  $112^{\circ}$  from the cape.

The bottom in Bender Erekli Bay is clay and sand, affording good holding ground, but it is not a safe anchorage in a west or northwest gale, unless well up in the bay, between Cape Baba and the ancient mole. There some shelter may be obtained from those winds. Country vessels lie moored head and stern in the bay during the whole winter and are said to be perfectly safe from every gale, although exposed to some fetch from the southwest.

**Town.**—The town (ancient Heraklea), which has a population of about 10,000, stands on the northeast shore of the bay,  $\frac{1}{4}$  mile eastward of Cape Baba, and was formerly of considerable extent. There was a castle and a mole, both of which are now in ruins. The remains of the ancient mole is about 300 yards in length, and extends in a  $202^{\circ}$  direction from a battery which stands on the shore about  $\frac{1}{4}$  mile  $112^{\circ}$  of Cape Baba.

**Coal.**—In normal times the Chamli and Kandilli mines, situated about 10 miles from Bender Erekli, have an output of about 110,000 tons annually. This coal is said to have a heating power nearly equal to the best Welsh coal. Caiques were employed during the winter, when the weather permitted, to bring coal to this bay from all the valleys where it is piled.

Coaling is performed by means of lighters. From 300 to 400 tons per day can be put on board.

**Coast.**—Kirpen (Kefken) Point bears 52 miles  $267^{\circ}$  from Cape Baba, and between them the coast falls back nearly 12 miles to the

southward, forming a deep bay. Westward of the Melen Su, which flows into the sea, 24 miles southwestward from Cape Baba, the coast is backed by mountains and fronted by a beach 27 miles in length, which terminates at Chalbi Point, where the mountains again border the shore.

**Sakarieh (Sargonius) River.**—The mouth of the Sakarieh River is 13 miles to the westward of Melen Su. There is a depth of 3 to 5 feet on the bar, whence the river has a depth of 3 fathoms for 8 miles, with an average breadth of about 90 yards.

**Kirpen Island** (lat.  $41^{\circ} 13' N.$ , long.  $30^{\circ} 17' E.$ ) is low, about 400 yards in extent, and lies about 400 yards northward of Kirpen Point, with a small islet close westward of it. From seaward the masts of vessels in Kefken anchorage can be seen over the island.

**Shoal.**—Shoal ground extends 250 yards westward of the lighthouse on Kirpen Island.

**Kirpen (Kefken) Point Light**, flashing white, 72 feet above high water, visible 12 miles, is exhibited from a white iron column located 66 yards from the western extremity of Kirpen Islet.

**Aspect of the coast.**—From a position 10 miles northward of Kirpen Island, in clear weather, Mount Agvah, a high-peaked mountain some distance to the westward and 5 miles from the coast, may be seen bearing about southwest, and an isolated peak, about 30 miles inland, bearing  $191^{\circ}$ , nearly over the two peaks of Mount Kandra, which are about 700 feet high and covered with trees, and back the anchorage of Kirpeh; also Kirpen Island Lighthouse. These observations may be useful, as the land in the vicinity of the point is said by some mariners to resemble the entrance to the Bosphorus.

**Kefken Bay** is formed between Kirpen Point and a point 2 miles west-southwestward of it.

**Shoals.**—A rock above water lies close eastward of the southwest point of the bay, and a shoal, known as Kefken Shoal, about 1,000 yards  $78^{\circ}$  from the eastern extremity of the same point.

**Anchorage.**—The islands and point are safe to approach, avoiding the shoal extending 200 yards westward of the shore of the lighthouse, and vessels anchor near Kirpen Point, protected by the islets from northerly and easterly winds, in 6 to 7 fathoms water. About 1 mile southwest of Kefken Bay is an inlet named False Kefken, but it is not used.

**Kerneh and Kirpeh Bays** lie about 2 and 3 miles, respectively, southwestward of Kefken Bay. Kerneh Bay has a depth of 3 to 4 fathoms and affords shelter from the northward, and small craft protect themselves under a low point from westerly winds. A bold headland separates Kerneh Bay from Kirpeh Bay to the southwestward, and the latter bay, which is about  $\frac{1}{4}$  mile in length from east



to west, is much preferred to the preceding one. In rounding the northern headland, give it a wide berth to avoid the rocks which lie to the southward of it, and anchor in 7 to 8 fathoms, sheltered from north and northwest winds and exposed only to the westward.

Bashna Island, 4 miles westward of Kirpeh Bay, has a tower on it.

**Kilia (Shilli).**—From Kirpeh Bay the coast trends in a westerly direction for 27 miles to Kilia Point, which slopes gradually toward the sea, terminating in a little chain of islands, evidently forming at one time a portion of it. The place to a stranger would seem to offer shelter in a northeast gale, as the cluster of islets appear to form a natural breakwater, but the sea rushes between them at such times with great fury and would render any attempt to ride out a gale extremely hazardous, more especially as the islets are surrounded by foul ground and the water shoals rapidly in the bay.

The town of Kilia or Shilli, built on the top of the point, is of considerable size, and exports large quantities of charcoal, and stones for building purposes. The small craft engaged in this trade have to be drawn up on shore to receive their cargoes and await a favorable opportunity for the return voyage to Constantinople.

There is telegraphic communication with Constantinople.

**Landmark.**—On the summit of the largest of the islets stands an old square tower, once part of an extensive castle, the ruins of which lie all round. The whole of the sea face of this ruin has been painted white, and is seen in clear weather at a great distance in all directions seaward.

**Kilia Point Light,** flashing white, 220 feet above high water, visible 21 miles, is exhibited from a pink stone tower located 109 yards from the extremity of the point.

**Lifeboat.**—A lifeboat and rocket station is established in the bay westward of the lighthouse, where also is a white tower.

**Marah Burnu.**—From the west end of Kilia Bay a range of hills extends along the shore as far as Marah Burnu, 5 miles. A few yards below the summit on the western slope of these hills in the mouth of a remarkable cave, which has given its name to the place. This cave runs a long distance inland, though the passage is very small and not sufficient to admit a man in an upright position.

**Rocket station.**—On the eastern slope of the hills stands a rocket house, painted white, with black gable ends.

**Allajalee.**—From Marah Burnu the hills recede about  $1\frac{1}{2}$  miles from the shore, having a low sandy piece of land at their foot, which about halfway between Marah Burnu and Kara Burnu stretches slightly into the sea, forming the sandy point of Allajalee. A few yards westward of the point there is a rocket house painted white with black gable ends.

**Coast.**—The sandy coast terminates at Armankiang, within 1½ miles of Kara Burnu, where there are a few chalk cliffs, from the top of which the ground rises gradually to the summit of the range of hills, of which Kara Burnu is the termination of a spur.

Between Kilia and Kara Burnu the shore is fringed with reefs and should not be approached within 1 mile as under that distance the water shoals rapidly.

**Rocket station.**—At Armankiang, above the chalk cliffs, stands a rocket house painted white with black gables.

**Kara Burnu—Landmarks.**—Kara Burnu slopes and narrows gradually as it stretches into the sea, but near its termination suddenly rises and swells out, forming a mound, which has a curious appearance, as, the earth having been washed away from the top, the boulders of which it is principally comprised stand up like the stones of a cemetery. The sea face of this mass of boulders has been painted white, as well as a cliff of greater elevation a few yards eastward of the point, and thus from the northward two patches are seen; in other directions only one. Foul ground extends around the point to the distance of 200 yards.

A few yards west of the rising ground, overlooking the mound, is a rocket station, painted white with black gable ends, as are all the rescue stations on the Asiatic side of the Bosphorus. There is also a refuge house.

**Coast.**—The country between Kara Burnu and Riva shows no sign of cultivation or of inhabitants, the nearest village being several miles inland. It is thickly covered with brushwood, arbutus, and other shrubs. A short distance westward of Kara Burnu, however, there is a small collection of huts named Mariola, where during the summer months a fishery is carried on, but which in the winter is deserted.

**Rocket stations.**—Between Kara Burnu and Riva there are two rocket stations and three rocket houses, painted white. These can be seen in clear weather from a long distance seaward. Mariola, abreast the huts, is a good place to beach a boat in heavy weather.

**Adarjiklar Burnu.**—From Mariola cliffs of a yellow color extend along the shore, with occasionally a small valley, at the entrance of which is generally a narrow slip of beach. Adarjiklar Burnu, one of the principal of these cliffs, projects somewhat from the shore, about 4 miles west of Kara Burnu. Close to the summit of his point on the side of the hill is a rocket station and refuge house.

**Galara Burnu—Landmark.**—The next projecting point westward is long and sloping. It terminates in a rock separated from the land by a narrow passage of a few yards in width, but which rock, not being of greater elevation than the point, has not the

slightest resemblance to Kara Burnu. The three faces of the point have been painted white as a distinguishing mark, seen in all directions seaward.

**Rocket station.**—A rocket station and refuge house is established near the point.

**Khair Sis Islet—Landmark.**—Khair Sis, or Good-for-nothing islet, as this name implies, lies about  $\frac{1}{2}$  mile eastward of Elmas Tabia Point, and is surrounded by reefs. It should not be approached within  $\frac{1}{2}$  mile. There is deep water between it and the shore, though the channel is narrow on account of foul ground lying off the islet. The islet is high, rises abruptly from the sea, and consists of two portions, connected in the center by a low ridge. The cliffs underneath the northern and larger portion have been whitened, presenting a mark seen in all directions from seaward.

**Elmas Tabia Burnu** (lat.  $41^{\circ} 14' N.$ , long.  $29^{\circ} 13' E.$ ).—This place, so named from the existence of a military station, is a bold headland, steep-to, and the termination of a range of hills that stretch away inland, forming the east side of the valley of Riva, through which runs the little river of the same name, reaching the sea at the foot and to the westward of the headland.

**Riva (Irva).**—The river is navigable for large boats to a considerable distance in the interior, and large quantities of charcoal and firewood are exported to Constantinople by means of it. The passage over the bar, however, being only open during the winter, the cargoes have in summer to be transhipped, which has necessitated the building of the village of Riva as a small seaport and home for the sailors engaged in this traffic.

There is an old castle standing at the mouth of the river, in which are mounted a few pieces of artillery, so that it is probable the traffic on the river was formerly considerable and the place of more importance.

**Anchorage.**—There is anchorage, in 4 fathoms,  $\frac{1}{2}$  mile westward of the village, the water shoaling quickly toward the shore.

**Lifeboat—Rocket station.**—There is a lifeboat station at the entrance to the river and a rocket station on Elmas Tabia Burnu.

**Telegraph.**—There is telegraphic communication with Constantinople from Elmas Tabia Fort.

**Coast.**—From the mouth of the Riva a long beach commences, which extends westward along the shore of the shallow bay, terminating in Yum Burnu. This beach should not be approached within 1 mile, as the water shoals rapidly.

**Sowak**, an islet lying in the depth of the bay between Riva and Yum Burnu, connected to the beach by a sandy spit, is of considerable elevation, and shelters the few huts built on the shore, where a fishery is carried on during the summer months.

**Sowakdere.**—Near the termination of the beach, and where a stream reaches the sea, is the best point to beach a disabled vessel unable to weather Yum Burnu.

**Yum Burnu** is a bold headland, steep-to, and so much more elevated than the land in the vicinity that the lighthouse on Cape Anatoli is not seen when approaching the entrance to the Bosphorus on a course more westerly than southwest by west. Vessels from the eastward should accordingly be careful not to alter their course to southward in the thick weather or in dark nights, until both lights at the Bosphorus are in sight. At those times, Elmas Tabia Point may be taken for Yum Burnu, and the vessel thereby placed in danger.

**Landmark.**—Underneath Yum Burnu the cliffs are whitewashed, showing a mark in all directions seaward for 15 miles. It sometimes appears double owing to a division in the marking.

**Fogsignal.**—The fogsignal on Yum Burnu is made by gunfire.

## APPENDIX.

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### REGULATIONS FOR VESSELS PROCEEDING TO SEA, VIA SULINA, FROM PORTS IN THE LOWER DANUBE.

Vessels which have shipped their cargo at one of the ports in the Lower Danube and do not require to carry out any operations in the port of Sulina may proceed direct to Sulina Roadstead.

Masters of vessels desiring to avail themselves of this privilege are recommended to communicate the fact by telegram to the captain of Sulina port on their departure from the port of loading, and mention in the telegram, as nearly as possible, the probable time of arrival at Sulina. Before reaching the Chatal de St. George, the vessel must hoist the Blue Peter at the foremast head, in order that the lookout at this station may notify the passing of the vessel to the captain of the port. This flag must be kept flying during the entire passage of the Sulina branch.

On the arrival of the vessel in the port of Sulina, an agent of the port police will proceed on board with a pilot for the passage over the bar, and on receiving from the master the ship's list will give the pilot permission to take the vessel direct to the roadstead.

As soon as the vessel has anchored, the master will return to the port in order to pay the navigation dues, present the bills of lading, and carry out other formalities required by the regulations. Afterwards the master may go on shore, or may send in his place one of his officers, together with the agent of the port police, who must present to the port administration the ship's list received by him.

If the vessel can not proceed direct to sea, owing to water on the bar, bad weather, or other circumstance, the master will be duly advised of this and must anchor within the bar.

It is especially important that masters wishing to proceed direct to Sulina Roadstead should arrange to leave the port of loading so as to arrive at Sulina at an hour when the offices of the European commissioner of the Danube, the quarantine offices, and the consulates are open.

**REGULATIONS FOR THE PASSAGE OF VESSELS THROUGH THE POLUNOCHNOE  
(MIDNIGHT) ENTRANCE TO THE DANUBE.**

1. A ball by day, or two lights (red over white) by night, hoisted on the signal mast, indicates that the midnight mouth and channel are clear for a vessel proceeding out of the river.

2. When no signal is shown from the signal mast, the entrance channel and mouth are clear for a vessel proceeding into the river from seaward.

3. Independently of any signal on the mast, every vessel must immediately communicate (by means of whistles, etc.), whether the channel be clear or not, with the vessels of the dredging flotilla at work in the midnight branch.

4. Steam tugs must fly a blue flag at the masthead by day, and carry two masthead lights by night.

5. Vessels are only permitted to make fast to the right (eastern) bank of the midnight mouth.

6. The draft of barges passing through the midnight mouth must not exceed 1 foot less than the depth in the channel.

7. Sailing vessels drawing 8 feet and over must be towed through the channel.

8. Two balls by day, or two red lights by night, hoisted on the signal mast, indicates that the channel is not clear for vessels either to enter or leave the river.

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1. Instructions for steamers following the ice breaker through ice in the Búg River and Kherson Bay:

Signals.	From ice breaker.	From steamer.
No. 1. Five short blasts on whistle.	Go ahead and follow me.....	Go ahead; or, I am going ahead.
No. 2. Three medium blasts.....	Go astern or reverse engines.....	I am going astern; or, go astern.
No. 3. Six short blasts.....	(1) If you wish to take towrope, get ready. (2) Let go my towrope.....	(1) Ready to take your towrope. (2) Have let go your towrope.
No. 4. Four short medium blasts. One ball at the masthead.	Stop..... (Order.)	Stopped; or, I am fast in the ice and can not move without help.
No. 5. Not less than 10 short blasts.	I am remaining for the night.....	

2. All steamers following the ice breaker should be ready to receive a towrope, and when being towed should be prepared to let go the towrope immediately when ordered by the ice breaker.

3. A steamer, when being towed, must not work her engines ahead, but must be always ready to go astern if the ice breaker gets into hard ice.

4. Steamers following ice breakers repeat the signaled whistles one after the other, in turn, beginning with the steamer nearest the ice breaker.

5. If on a steamer following the ice breaker through ice there is any damage or leak, that steamer hoists the signal N C (O V in the Russian code) in the International Code of Signals. The signal and whistles are repeated by each steamer lying between the vessel in distress and the ice breaker as soon as the ice breaker notices and hoists the answering pennant, the steamers repeating the signal haul down. The steamer on board which there is the damage at the same time will connect the pumps to the place or compartment where the water should be pumped out first of all.





# INDEX.

A.		Page.			Page.
Abikhu Point	-----	286	Ajalkski Lake	-----	190
Abuliona Lake	-----	83	Ak Bashi	-----	29
— geul	-----	82	— — Bay	-----	44
Abydos	-----	44	— — Liman	-----	28
— Bank	-----	33	— — Valley	-----	28
— Point	-----	32, 33	Ak Bunar	-----	134
Accuracy of chart	-----	2	Ak Burnu	-----	147,
Achilles, tomb of	-----	23	232, 235, 236, 238, 243, 244		
Achuev	-----	247	— — Bank	-----	235, 238
Ada Klor	-----	310	— — buoys	-----	236
Adalar Rocks	-----	225	— — Shoal	-----	236, 244
Adam Kaya	-----	69	Ak Burtch	-----	237
Adar Burnu	-----	60	Ak Liman	-----	310
Adarjiklar Burnu	-----	318	— — coast	-----	310
Adirnas Chai	-----	83	Ak Yarlal	-----	36, 55
Adjubai village	-----	270	— — Dagb	-----	65
Adler Point	-----	285	— — Mountain	-----	40
— — anchorage	-----	285	Akhilleon, Cape	-----	243
— — Light	-----	285	Akhilu	-----	144, 145
Adrianople	-----	111	Akhmanai	-----	270
Adzhigiol Point	-----	187	Akhtanizovka	-----	240
Adzhlyask Point	-----	183	— caution	-----	246
Afisia	-----	76, 77	— Liman	-----	246
Agatchili	-----	134	Akhtar	-----	247, 248
Agathopoli	-----	138	— Bay	-----	247
Aghi Dagb	-----	34, 35	— Lake	-----	247
Agios Elias Point	-----	85	— Light	-----	248
— — dangers	-----	85	Akin, Cape	-----	142
Agria Petra	-----	80	Akmechet Harbor	-----	206
Agsl	-----	306	— — anchorage	-----	206
Agvah, Mount	-----	316	— — beacons	-----	206
Aia Cape	-----	220, 221, 222	— — Shoal	-----	206
— — anchorage	-----	222	Akrianu geul	-----	143
— — landmarks	-----	222	Akroteri Point	-----	145
Aidinjik village	-----	70	Aksas Burnu	-----	67
Aidinli Hills	-----	96	— village	-----	67
Aidos Dagb	-----	97, 98, 109	Aksenof Rocks	-----	240
Aids	-----	5	Alar Point	-----	227
Alik Atlama Point	-----	229	Albanians	-----	88
Altodor, Cape	-----	223, 224, 225	Alchak Kaya, Cape	-----	227
— — caution	-----	224	Alem Dagb	-----	98, 136
— — fog signal	-----	224	Alesso Point	-----	314
— — landmark	-----	224	Alexander Point	-----	211
— — Light	-----	224	Alexandrovka village	-----	191
— — signal station	-----	224	Alexandrovsk	-----	193

	Page.		Page.
Alexsyeevka village	205	Apollonia	83, 84
Alichi Isthmus	74	— Lake	83
Allajalee	317	— River	83
Alma River	209	Arabat	267, 269
Alonyl	75	— Bay	270
Altintas	87	— Fort	269
Altmuhl River	155	Arabatsk Point	269
Alupka	223	Arablar	51, 77, 79
Alushta anchorage	227	— Channel	76
— coast	227	— Island	74-76-77
— Fort	227	— shores	76
— Light	227	Arapli Tepe	56
— Roadsteads	227	Aren Kloi	24
— village	226	Argero Point	76
Amastra	312	Arkava	299
— Bay	312	Armankiang	318
— Light	312	— coast	318
Amastris	312	— rocket station	318
Ambarli	62	Armene	310
Ambelaki Bay	235	Armenia Point	259
Amisus	308	Armudi	51
Anadolu	107	Armudli	88
— Hissari	104, 121	— anchorage	88
Anakonli River	287	Arnaut Burnu	86-88
Anakria anchorage	290	— Point	104, 107, 108, 114, 115
Anapa	274	Arsenal	66
— Point	274, 275	Artace	71
— Road	274	Artaki	49, 51, 68, 70, 71, 80
Anastatia Island	142	— Bay	70, 71, 72
— Light	142	— coast	71
Anatoli	125	— communication	71
— Cape	320	— Gulf	68
— fog signal	124	— Peninsula	50, 69, 72, 73, 76, 80
— Kalessi	124	Artillery Bay	212
— Kavak	47, 119, 124	Aschachtown	156
— Light	124	Ashampe Creek	280
— Lighthouse	124, 131	Asiatic coast	109
— Point	132	Askoros Point	300
Anatolia	293, 310	— River	300
Anatolian coast	299	Aspra Homata	24, 47
— railway	93	Aspro Cape	147
Andirovitha	101	Athanatos	139
Andreas	96	Athina	299
— Island	96	Avuzlar	23
Andreyef	240	Ay Andrea	80
Androsovski mole	179	Ay Georgios	80
Angora	93-111	— Burnu	96
Ankhelu Geul	144	— coast	96
Antigone	100-102	Ay Ioanni Monastery	80
Antonlos Point	311	Ay Kiriaki	88, 89
— anchorage	311	Ay Petros	223
Apana	311	Ayansha	78

Aylos Petros	Page. 140
—— Island	141
—— port	140
Ayu Dagh, Cape	225, 226
—— current	226
Azov, Sea of	17, 47, 108, 233, 237, 239, 244, 246, 249, 253, 258
—— currents	233
—— water level	233
Azrathena	61

**B.**

Baba Burnu	60
—— Cape	314, 316
Bafra, Cape	309
Bagatubi Point	270
Bagche Kloi	118
Baghdad	308
Baghlar Point	140
Baglan Point	289
Bahir	35
Bairak Tepe	29
Bairam Dere	64, 65
Bakajak Hill	29
Bakal	205
—— Lake	205
—— anchorage	205
—— Spit	204
—— Bank	204
—— Beacon	204
—— landmarks	204
Bakirli Isthmus	140
Baku	292, 297
Balaban Cliff	174
Balabanovka Spits	195
Balaklava Harbor	220, 221
—— clearing marks	221
—— directions	221
—— inner anchorage	221
—— outer anchorage	221
—— Rock	221
Baljik Bay	150
—— anchorage	150, 151
Balta Liman	104, 116
Baonusa	71
Barbers Point	25
—— Light	25
Barshana River	293
Bartheni River	313
—— coast	313
Bartzkhana River	293
Baschesme	37
—— Liman	37

Bash Iskalessi	Page. 92
Bashna Island	317
Basiliko	139
—— Harbor	138
Batlama River	305
Batmez Vorthonas	97
Batova Baljik	150
—— Bay	150
Batum	297
—— Bay	293
—— buoys	294
—— directions	296
—— winds	294
—— communications	275, 288, 293, 297
—— Harbor	294
—— anchorage	295
—— Berthing regulations	295
—— Lights	295
—— Point	299
Bazaar anchorage	305
Bazar Kloi	90
Bear Mountain	226
Bebek Bay	115
—— Light	115
Belkos Bay	104, 106, 112, 117, 121, 122
Beikuch Liman	185
—— town	185
Beisug Harbor	248
—— Liman	248
—— River	248
Belbek River	211
Belgrade	118
Bender Erekl Bay	314
—— anchorage	315
Berda River	263
Berdiansk	264
—— communication	264
—— Light	264
—— Lighthouse	264
—— Point Light	262, 263, 266
—— Lighthouse	263
Berezan Island	184
—— Beacon	184
—— Buoy	184
—— fogsignal	184
—— Light	184
—— range mark	184-194
—— Liman	184
—— Bar	185
—— beacons	185
—— directions	185
Bergaz	29

	Page.		Page.
Bergaz Asmak River	35	Bosporus lifeboat station	132
— Bank	35	— rocket	132
— Clump	34	— to Odessa	131
— Iskalessi	34	— weather	107
— Lighthouse	35	— winds	107, 108
— River	35, 36	Bostunji	50, 97
Berluch Peninsula	266, 267	Boz Bank	54
— Spit	266, 268	— Burnu	51, 65, 84, 85, 88
— Light	267	— coast	88
— Lighthouse	267	— Cape	65
Bes Chamlik	33, 34	— Peninsula	88, 89
Beshik Tash	113	— landing places	89
Besleta Rivulet	289	— topography	89
Beta Bay	282	— Tepe	301
Beyaz Burnu	78, 80	Boztepe Point	309
Beyler Bey	120	Braila	171
Beylik Karlik Dag	89	— coal	171
Bielogrudov Entrance	192	— Dock	171
Biga Shehir	68-69	— Hospital	171
— Chal	67, 69	— mooring	171
Biscuit Cove	213	— supplies	171
Black Mountain	228	Bridge of Boats	198
— River	213	Brothers, The	98
— Sea	15, 30, 43, 97, 98, 123, 125, 230, 233, 237, 244, 261, 292, 298	Brusa	86
— current	126	— communication	87, 88, 91
— Light	130	Bublikov, Cape	191
— northern shore	183	Bug River	189, 194
— weather	123	— general information	194, 195, 196, 197
— white fogs	130	Bugaz Channel	240, 273, 274
— winds	128	— Point	273
— winter buoyage	130	Bulair Isthmus	38
Blonde Rock	145	— village	56
Blyukdere	117	Buleb	299
Boados	61	Bulganak	209
Bokali Kalessi	27, 28, 44	Bulghurlu	55
— Light	28	— Mount	63, 109, 120
— Valley	27, 28	Buoys	5
Bolshoi Island	291	Burgas	118
Bombori, Fort	287	Burghaz	125, 140
— Road	287	— Bay	143, 144
Bos Tepesi, Mount	305	— Light	141
— Promontory	305	— Gulf	140, 141
Boskov Tepe	88	— Liman	143
Boskuia village	267	— Point	145
Bosporus	15, 51, 79, 97, 98, 100, 110, 111, 112, 114, 117, 119, 122, 131, 132, 134, 136, 320	— Rock	145
— anchorage	100	— Shoals	144
— approach	131	Burun Tabla	293, 297
— currents	105, 106	— Cape	294, 295
— directions	103	— lifeboat	297
— general description	103	— Mole	295
		— supplies	297, 298
		Burunski Channel	234, 243

	Page.
Bushy Peak	104, 123
Buyuk Bay	117-119
— Chekmeje	61, 62
— Bay	61
— Dere	36
— River	96
— Kale	305, 306
Buyukdere	108, 118
— Bay	106, 108, 117
— anchorage	117
— patent slip	118
Byeglitzki	262
— Lightvessel	249, 256
— Spit	255
Byelosarai Light	249
— Lighthouse	262
— Spit	249, 252, 263
Byzantine	67, 94, 96
Bzulb River	286

**C.**

Cabotage Harbor	198, 295
Calbi Point	316
Camel	226
Camilla	226
Cape Baba Light	315
— Baфра Light	309
— Chardak Light	28
— Eminèh Light	147
— Helles Light	22
— Ieros Light	303
— Ineboli Light	311
— Injeh Light	311
— Kadosh Light	283
— Kallakra Light	151
— Kerempeh Light	312
— Kukumar Pasha Liman, Island	75
— Kuri Light	137
— Pavlovski Light	235
— Shableh Light	152
— St. Ellas Light	229
— Tuzla Light	153
— Yenikale Light	239
— Yenikale Lighthouse	239
— Shoal	239
— Tarkan Light	207
Careening Bay	213
Carusa	309
Caspian Sea	298
Caucasus Mountains	261
Centre Islands	75
Chagani	270
— Point	270

	Page.
Chal Tepe	67
Chalbi Point	316
Chaldi Point	307
Chalka, Mount	228
Chakras	312
Cham Kalessi	27
— Liman	101, 102
Chamll coal mines	315
Chamlja	106
— Hills	63, 98
Chan Kair	38
Chanak	23, 30, 37, 45, 47
— Kelassi	25, 29, 30, 44, 46
— Kelassi Light	30
— pilots	8
— point	31
Chanta	60
— Tepe	60
Chardak	45
— Bank	39
— Burnu Lighthouse	40
— Lagoon	39, 40
— Lighthouse	41
— Ova	39
— Spit	40
Charts	1
— largest scale	3
— small scale	3
Chatal	89
— Burnu	89, 90
— coast	90
— Dagh	98, 136
— de St. George	161
Chatalja	60
— Valley	62
Chatuir Dagh	226, 227
— Mountain	209
Chauda, Cape	229, 230, 231
— range marks	232
Chaudinski Light	231
Chekmejeh Floria Station	63
Chelengos	136
— Deresi	136
Chernose Rocks	145
Chengiler village	90
Cheraghan	113
Cherepakha	256
— Island	257
Chernamorskaya Kolod village	201
Chernavoda	154
Chernaya River	213
Cherno Protok	247
Chernoe More	15



	Page.		Page.
Derinji Burnu .....	93	Dolma Bagche .....	64, 113
— coast .....	93	— Palace .....	98, 99
Derkos Deresi .....	135, 136	— clearing mark .....	98
— Lake .....	135	Don Cossacks .....	255
— village .....	135	— River .....	249, 252, 259
Deserters, The .....	95	— entrance lightvessel .....	251
— directions .....	96	— buoy .....	251
— Islet .....	95	— fogsignal .....	251
De Tott's battery .....	46	Donauworth .....	155
Deve Boyunu Burnu .....	88, 89	Donetz .....	253
— coast .....	89	Doob Lighthouse .....	279
Devils Current .....	107, 116	— Points .....	277
Devino Lake .....	149	Dovinovka Lake .....	183
— Light .....	149	Drakontas Bay .....	73
Diana Shoal .....	40	Drakos Tepe .....	97
Didova Khata Lighthouse .....	195	Dranovo Island .....	162
Dikili Rock .....	105, 118, 119	Drono River .....	301
Dil Burnu .....	90, 91, 94	Duimi Bank .....	115
— coast .....	91	— Light .....	115
— Shoal .....	91	Dumus Dere .....	132, 134
— Iskalessi .....	91	— Sand Patches .....	134
— Point .....	94	Dut Liman .....	81, 82
Dilderesi River .....	94	Dvolnala Bay .....	218
Dioscurias .....	288	Dvuyakorno Bay .....	229
Dirzye .....	276	— anchorage .....	229
Diumi Bank .....	114	Dyurmen, Mount .....	231
Diva Rock .....	223	— Point .....	231
Dneiper Bay .....	185	— anchorage .....	231
— general information .....	185,	Dzhankot Valley .....	281
	186	Dzharullgach Bay .....	202
— River .....	192	— Island .....	202
— approach .....	191	— Point .....	202
— general information .....	192,	— Spit .....	202
	193	Dzhankot .....	281
Dnelster Estuary .....	174	Dzhubg anchorage .....	282
— caution .....	175	— Light .....	282
Dnelster River .....	175		
— depth signals .....	175		
— Light .....	175		
— range lights .....	175		
Dofinovka Lake .....	183		
— lifeboat .....	183		
Dockyard Creek .....	214		
Dohan Aslan Burnu .....	55		
— Shoal .....	54		
Dolga Bank .....	248		
— fogsignal .....	249		
— lightbuoy .....	249		
— Point .....	248, 249		
— Spit .....	248, 249		
Dolghi Island .....	200		

## E.

East Bank .....	84
— Bay .....	84
— anchorage .....	84
— Channel .....	279
— Point .....	177
Eastern Rumelia .....	139
Egorlitz Gulf .....	200
— anchorage .....	200
Egurcha Mouth .....	260
Eisk .....	250
— Liman .....	249
Ekaterininski Quay .....	214
Ekaterinodar .....	250

	Page.		Page.
Ekinik .....	77	Fairway Patch .....	75, 76
— water .....	77	Falko Point .....	301
Elchan Kaya Rocks .....	231	False Bay .....	35
Eleusa Point .....	302	— Entrance .....	132, 135
Ellia Tepe .....	56, 57	— Kefken .....	316
Elias Mount .....	74	Fanar .....	239
Elmas Tabia Burnu .....	319	— Adasi .....	79, 80
— anchorage .....	319	— Islet .....	80
— lifeboat .....	319	— Bagche .....	97, 98
— rocket station .....	319	— Bank .....	98, 100
— Point .....	319, 320	— Burnu .....	98
Emineh Cape .....	140-145, 146	— Light .....	98
— Mount .....	146, 147	Fanar, Cape .....	263
Engelhartzell .....	156	— Point .....	102, 110
Englishman Bank .....	123	Fanaraki .....	119
— Light .....	123	Fanous Hill .....	40, 41, 65
— Banks .....	104-106, 117-122, 123	— Lighthouse .....	40
Enns .....	156	Fathom curves, caution .....	3
Epivates .....	61	Fatsa Bay .....	306
Erdek .....	70-71	— Light .....	306
Eregli .....	93, 111	Fatsa Reef .....	306
Erekli Bay .....	59	Favlini Bay .....	73
— Hill .....	60	Fedotova Spit .....	266
— Light .....	60	Feolent Cape .....	219, 222
— Peninsula .....	51, 59	Fidji, Cape .....	300
Erekli, Cape .....	300	Fido Nisi Island .....	173
Eriklik Palace .....	225	— Light .....	174
Erivan .....	297	Fil Burnu .....	124
Ermeni Kloi .....	81	Filar Dag .....	87
Erzerum .....	300	Fine Hellenic .....	66
Eskel Liman .....	85	Fischameat-Thabea Rapids .....	156
— coast .....	85	Fistikli Valley .....	88
Eski Dag .....	228	Fixing position .....	12
— Fanar .....	53	Fog signals .....	8
— Burnu .....	38	Fontana, Cape .....	177
— Hissar .....	94	— fog signals .....	177
— Fanaraki Burnu .....	133	— Light .....	177
— Hisarlik .....	22, 44	— Shoals .....	177
— Point .....	22	Foros Church .....	223
— Tarabozun .....	299	Foul ground .....	148
Eupatoria .....	208	Fulo Mountain .....	312
— general information .....	208, 209	Fulton Rock .....	240
Eupatoria Point .....	208	— buoys .....	241
— fog signal .....	208	— clearing mark .....	241
— Light .....	208	Fundukli .....	113
European shore .....	107, 110	Furun Islets .....	304
European shore of the Bosphorus .....	108		
Euxinograd Bay .....	150		
Evlar Burnu Tabia .....	149		
Evlidge Burnu Light .....	315		
Examile village .....	56		
Eyub .....	112		

## G.

Gagri .....	285
— communication .....	286
— Light .....	286
— Pier .....	286



	Page.
Gluk Dagh.....	92
Giurgevo.....	171
Glafirovka.....	250
— Point .....	249, 251
Glaromiti Point.....	72, 75, 76
Goenen Chai.....	69
— sand bank.....	69
Golden Horn....	108-111-112, 118-120
Gollandiya Cove.....	215
Golovin.....	284
Gonia Bay.....	72
Good-for-nothing Islet .....	319
Grafski Quay.....	214
Granicus.....	68
Great Otorek Point.....	174
Grecheskaya Bank.....	252
Grecian Archipelago.....	21
— Temple.....	236
Greco, Cape.....	21-45
Greiner Schwall Rapid.....	156
Gudant Lighthouse.....	288
Guebze.....	92
Gulf of Ismid Light.....	91-95
Guldere.....	118
Gunieh.....	298
Gurda.....	293
Guz Coull.....	120

Haldar Pasha	93, 99, 111
— buoys	99
— Harbor	99
— Lights	99
Halkl	100, 102
— Channel	102
— Island	101
Halko	72, 73
Halva Range Island	56
Halva Tepe Range	56
Halys Point	309
— Light	309
Haman Dere	90
Hamidieh Fort	30
Hannibal	94
Harakhi Point	72
Hecula, Tumulus of	26
Helles	45
— Cape	21, 45
Heraclea	60
— coal mines	314
Heracilitza Burnu	54, 57
— Point	53
Heraklea	315

	Page.		Page.
Hereke Tash Rock .....	98	Isnik Lake .....	87
Hersek .....	91	Ispir .....	300
— Tash .....	98	Istambul .....	111
Herekhe .....	94	Istavros .....	120
— Bay .....	94	Istenleh Bay .....	116
Highflyer Rock .....	240	Italians Porto Genorese .....	229
— Buoy .....	240	Ivan, Lake .....	260
Hissar Kalasi .....	132, 133, 134	Islaz Pass .....	157
Hissars .....	107		
Hora Light .....	54, 57		
— Point .....	54		
Hudro Plaka .....	77		
— Ledge .....	77		
Hukhlia .....	72, 74		
Hum Burnu .....	89		
Hydrographic Bulletins .....	6		
	I.		J.
Ibrahim .....	118	Jelegra Cape .....	150, 151
Ida, Mount .....	21	Jibriani Bay .....	173
Idokopas, Cape .....	281	— beacons .....	173
Ieros, Cape .....	303	Joannes, Port .....	140
Ilanjik .....	148	Joski village .....	147
Ilinskoe village .....	194	Julia, Cape .....	271
Iller River .....	155	Justinian .....	118
Ilmen, Cape .....	223		
Imperial Port .....	179		
Imrali Island .....	84		
Ina River .....	155		
Inada Road .....	137, 146		
Indek, Mount .....	227		
Indji Liman .....	29, 45		
Ineboli .....	311		
— communication .....	311		
Ingul River .....	194, 290		
Injar Bay .....	122		
Injeh Burnu .....	56		
— Cape .....	310		
Injir Bay .....	107, 121		
— Liman .....	85		
— Point .....	309		
Inkerman Lights .....	214		
Iron Gates Rapids .....	157		
Irva .....	319		
Iris Point .....	307		
Isakcha .....	169		
— pier .....	169		
Iskuria Point .....	289		
Ismail .....	172		
Ismid .....	49, 92, 93, 111		
— anchorage .....	93		
— communication .....	93		
— Gulf .....	89, 90, 92, 94, 97		
— railway .....	99		
			K.
		Kaba Burnu .....	61
		Kabakli .....	90
		Kabardinski Fort .....	277, 279
		Kacha anchorage .....	210
		Kadi Klori Haidar Pasha .....	99
		Kadosh Cape .....	283
		Kaffa .....	230
		— Bay .....	229, 230, 269
		Kagalnik .....	252, 259
		Kaighat Basin .....	112
		Kalmakam .....	57, 61, 68, 71, 91, 94
		Kair Burnu .....	33
		Kalsh Dag .....	97, 109
		Kalanchak Island Spit .....	204
		Kalaphotia Rock .....	133
		Kalatch .....	261
		Kale Burnu .....	69
		— Light .....	68
		Kalem Burnu .....	88
		Kaliakra Cape .....	150, 151, 152
		Kallerachi .....	62
		Kalokratia .....	62
		Kalamita Bay .....	208, 209
		Kalin Burnu .....	81
		Kalion Point .....	307, 308, 309
		Kalmek Point .....	301
		— anchorage .....	302
		— Mole .....	302
		Kalmius, River .....	253
		Kalogiei village .....	174
		Kalolimno .....	84
		— Island .....	50, 82
		Kalolimnos Point .....	77, 78
		Kamaris .....	65, 66
		— Liman .....	66

	Page.		Page.
Kamarun Point	207	Karatokus Hills	38
Kamchy River	147, 148	— Range	56
Kammenoi Cape	242, 243, 246	Karajali	88
Kamiesh Bay	218	Karakova Burnu	29
Kamir	65	— Light	29
— Chal	65	— Point	45
— communication	66	— River	29, 36
— Ovasi	66	Karamrun Point	205
— River	65	Karamusal	91
— Valley	66	Karangat village	231
— water	66	Karantinni Mole	179
Kamishevataya Church	248	Karavy Rocks	231
— Point	247, 248	Karejlk Point	306
Kamisler	285	Kareli River	293
Kamuish	235	Karga Burnu	59
— Burnu	234	Karibjeh Point	119
— Bay	235	Karidies	146
— range lights	235	Karkinit Bay	203
— range lights	234	Karolina village	174
— Lighthouse	242, 243, 244	Kartal	97
Kandilli	98, 104, 121	Kartkazak	205
— Bank	121	Kasau Pass	157
— coal mines	315	Kastel, Mount	226
— Point	120	Kastro Deresi	136
— Light	121	Katirli	88
Kandra Mount	316	Katsevelo Scala Bay	142
Kangarli	35	Kava Burnu	94
Kapkane	222	— coast	94
Kapsala Burnu	73, 80	Kavah Burnu	99
— coast	73	Kavak	47
Kapskhor Roadstead	227	— Bay	140
Kapu Dagh	49, 69	— Iskalessi	90, 91
Kara Agatch	312	— anchorage	91
— Cape	139	— Point	119, 123, 124
— Cove	139	— light	124
— Bogha	68	Kavakli Liman	87
— Burnu	67, 68, 132,	Kavanlik Liman	24, 43
134, 135, 136, 172, 317, 318, 319		Kavarna	151
— Cape	205	— Bay	150
— Light	135	Kavo Kroti	146
— village	135	Kavos Svitera	141
— Cape	49	Kaza-kildi Valley	311
— Dagh	81, 82, 228	Kazach Bay	218
— Kioi Tepe	60	Kazantip	270
— Point	303	— Bay	270
— Su	62, 82, 83	— Point	270
Karabuga	68, 69	Kaze village	185
— Bay	67, 68	Kazen Channel	201
— anchorage	68	Kechili Bay	124
— Village	68	Kechli Kioi	117
Karadzha Bay	207	Kefken Point	315
— life-saving station	207	— Shoal	316
— Light	207	Kelasur River	289

	Page.		Page.
Kelasur Valley	280	Kherseti	236
Kelheim	155	Kherson	193
Kemel	34	— Bay	183, 185, 186, 188
Kemer Point	299	— communication	193
Keoschih village	247	— ice	193
Keoseh Kalessi	26, 31	— trade	193
Kephez Bay	25	Khersonese Bay	218
— Light	26	— Cape	219
— Point	24, 43	— buoys	219
Kephex Point	25	— directions	219
Kerasia Deresi	57	— fog signal	219
Kerasunda	304	— signal station	219
— Light	304	— storm signals	219
— Promontory	305	Khoba Point	227
Kerempeh, Cape	311, 312	Khoban Kalessi	227
— coast	311	Khopi	292
Keresli Iskalessi	65	— River	290
Kerneh	316	Khopitsai	281
Kerpeh Bay	316	Khoppa	299
Kertch	233, 259, 269	Khopsi Point	301
— Bay	236	Khorli Port	204
— coal	237	— general information	204, 205
— communication	237	Khosta	285
— Fort	235	Khroni Cape	239, 271
— harbor works	236	Khronia Mount	239, 271
— Light Buoy	237	Khukhup	285
— Lighthouse	238	Kiaghat Khane	109
— pilots	237	Kiamleh	27
— Road	238, 244	Kidros	312
— Strait	224, 231,	Kieulu Dagh	85
	232, 233, 236, 239, 240, 241,	Kilik Atlama Point	228
	242, 243, 262, 270, 271, 295	Kikeneiz, Cape	223
— caution	236	— coast	223
— depths	233	— landmark	223
— Yenikale	238, 242	Kileri Burnu	94
— Channel	239, 243	— Coast	94
Keshish Dagh	86, 87	Kiles Deresi	92, 93
Kezil Kechili	34	— Bank	93
Keziljadere	56	Kilia	172, 317, 318
Khair Sis	319	— Bahr	26
— Islet	319	— Bay	317
— landmarks	319	— Point	132, 317
Khairsiz Ada	78	— Light	317
Khablova Point	195	Kilid Bahr	23, 31
Khalka Vala Beach	303	Kilidj Burnu	135
Khanet Kalessi Islet	306	Kilimoli Point	313
Khanlijeh	104, 107, 121	Kilios	131, 133
— Point	104, 116	— Bay	132
— Light	121	— Point	133, 134
Kharkov	258	Kilisi Point	224
Khelia Liman	27, 28	Kinburn Bay	200
— Bay	28	— anchorage	200
— Tepe	27, 28	— Point	186

	Page.		Page.
Kinburn Point Beacon.....	186	Konstantine Light.....	196
Kinburn Spit.....	183, 187	Koragelnaia Creek.....	215
— buoys.....	187	Korak Point.....	124
Kinogly Point.....	311	Korakas Cape.....	140
Kintrish.....	293	Korokhia Point.....	71
Kiobashi Point.....	104, 107, 116	Kosenko farm.....	239
Kior Tam Bank.....	304	— telegraph cables.....	239
Kirich.....	106	Koslov.....	208
— Point.....	106, 117, 123	Koslu Bay.....	314
Kirilovka.....	267	— anchorage.....	314
— Point.....	266, 267	— Valley, coal.....	314
Kiritch Burnu Light.....	117	Kotsan Point.....	147
Kirpeh.....	316	Kovata Point.....	301
— Bay.....	316	— Road.....	301
— landmark.....	317	Kozirka village.....	195
— lifeboat.....	317	Krimea Peninsula.....	125
Kirpen Island.....	316	Krivaya Banks.....	249
— aspect of coast.....	316	— Spit.....	195, 251, 255
— Lighthouse.....	316	— Beacon.....	262
— Shoal.....	316	Krugoi Bank.....	239, 243
— Islet.....	316	— buoys.....	239, 243
— Point.....	315, 316	Kuban.....	250
— anchorage.....	316	— Lake.....	240, 273
— Light.....	316	— River.....	246, 247
Kise.....	299	Kuchuk Chekmeje.....	63
Kishla Cape.....	240, 273	— Bay.....	62, 63
— Reef.....	240	— Ghiok Su.....	104
— outlying dangers.....	240	— Iskalessi.....	94
Kisliakovka Light.....	196	— Lambat village.....	226
Kisi Agsi Bay.....	315	Kug Dere.....	62
Kiten Point.....	270	Kuildi Reef.....	311
Kiupriji Deresi.....	59	Kuiln Murun.....	204
Kiz Kalessi, coast.....	299	Kuiz Point.....	231
Kizil Irmak.....	309	Kukumar Cape.....	74
Kizilbash.....	225	Kular.....	92
Kizim Point.....	191	Kule Tepesi.....	94
Klapsi Mount.....	72	— water.....	94
Klazti Bay.....	79, 80	Kum Bagha.....	58
Koba Point.....	227	— Kale.....	21, 43, 45, 46
Kodja Burnu.....	53	— Light.....	24
Kodjuk Burnu.....	33, 34, 44	— Point.....	44
Kodor Point.....	289	— anchorages.....	81
— caution.....	289	— Liman.....	81
— coast.....	289	Kumalir River.....	274, 275
Koktabel, Bay.....	228	Kumjugaz Road.....	309
Konia.....	93, 111	Kumli Iskalessi.....	88
Konstantin Cape.....	211	— Valley.....	89
— buoys.....	211	Kunduz.....	134
— range mark.....	211	Kunlezi, River.....	280
— Fort.....	196	Kurbagha Deresi.....	98
— Light.....	196	Kurchan Liman Lake.....	246
— Shoal.....	211	Kureli Point.....	303
— Point.....	285	Kuri Cape.....	137, 138



	Page.		Page.
Maniyas Lake	71, 81, 82, 83, 84	Mezar	117
— anchorage	82	— Burnu	95, 117, 118
Marah Burnu	317	— anchorage	95
— rocket station	317	— Banks	95
Margaritovka	251	— Point	117
— lifeboat	251	Mezib	280, 281
Mariola	318	Mezumta River	285
Mariupol	252, 253	Michailoffskoe, Fort	282
— Basin	262	Middle Bank	46
— communication	253	— ground	75, 278
— Gulf	249	— Harbor	179
— Light	253	Midia Cape	152, 155
— Port	254	Midiah	137
Markitan Spit	242	Midnight Branch	172
Marmara	78, 80	— depth signals	173
— Channel	79	— range lights	172
— channel dangers	79	— signal stations	173
— Island	15, 51, 54, 78, 79, 111	Miliya Uzen Roadstead	227
— Island Light	80	Milos Point	84
— Point	76	Mingrella	293
— Sea	15, 21, 30, 36, 42, 49, 50, 51, 97, 109, 111	Miskhak Point	276
— Tower	64, 109	Miskhor	223, 224
— village	79	— Estate	223
Marselle	308	Mitridate Mount	236, 237, 244
Mary Magdalene Bank	273	— storm signals	237
— Rock	273	Mius River	255
Mastusium Promontory	21	Moalitch	82, 83, 84, 85
Mauda Tash Burnu	61, 62	— anchorage	83
Mavro	96	— Bay	83
Mayake	175	— River	84
Mean sea level	2	Moda Bay	98
Mecca	120	— Burnu	73, 99, 100
Mediterranean	111	— coast	99
Medjidieh Battery	31	— Liman	98
Megabl, Mount	225	Modoa Bay	99
Megalo Nisi	141	Mola	80
— Island	141	— Islands	80
Meganom, Cape	223, 226, 228	Molas	80
Megarislík Hills	55	— anchorage	80
Melen Su	316	Molos	134
Melet	305	— Valley	134
Mendere Bank	24, 44	Molosh Lake	266
— River	24	Monopetra Athia Kavo	142
Mercator chart	3	— Point	142
Merinovoe Mouth	261	Monastir-Aghzy	47
Mermer Adasi	78	Morto Bay	22, 44
Mermerjik Bay	79, 80	Moscow	261
Messageries Maritime & Paquet		Moussa Bank	33
Companies	280	Moussa Kiol Chai	33
Messemvria	145, 146	— River	33
Mexa	80	Mudania	49, 86, 87, 88
Meykhane Burnu	88	— coast	87
		— communication	86

	Page.		Page.
Mudania Gulf	50, 51, 87	Nine-fathom Patches	85
Mudlr	74	Niopoll	311
Muhanla village	81	Nisi Island	80
Mujue Point	122, 123	North Center Island	76
Mungafa	95	— Pass	75
Murad Bair	70, 71	— directions	75
Muris Dagb Peak	145	Northwest Aksef	240
— geul	143	Notes on charts	4
Musacha	69	Notices to Mariners	6
Mussulman	37	Novo Afonski Monastery	287
Mustakuba Point	285	— Michailoffskaya	283
Mutesserif	92	Novorossisk	237, 277, 279
Mutha Point	71, 72	— Bay	277, 279
Myriophyto	57	— Harbor	278, 279
— Point	54	Novotroitskoe	282
Mysian Olympus	85, 87	Nugaigus, Mount	284
<b>N.</b>		<b>O.</b>	
Nagara Bay	32, 33	Obltochna Banks	266
— Buoy	46	— Spit	265, 266
— Kalessi	32	Ochakov Channel	196
— Lighthouse	32	— dredged channel	189
— Liman	48	— beacons	189
— Point	31, 32, 44	— buoys	189
Naidena Spit	249, 250	— depth signals	1899
Nakhitchewan	261	— lighthouses	189
Namazieh	46	— lights	189
— Point	26, 44	— Point	186
Namazieih Battery	23	— depth signals	186
Natukhadi	280	— lifeboats	186
Navaginskoe, Fort	284	— pilot stations	186
Nebiene Mountains	308	— pratique	186
Nechepsuko Bay	282	— quarantine pier	186
Nehmetskaya Valley	183	— signal station	186
Neustadt	155	— storm signals	186
New Basin	258	— to Adzhigiol Point	187
— Harbor	179	— Spit	252
— Yeisk	250	Ochemchiri anchorage	290
Niandro	101	— Light	290
Nicholas Point	212	Odessa	180, 238, 275, 297, 301
— Lightbuoy	212	— general information	180, 181
Niger Rock	234	— Bank	190
— Buoy	234	— Bay	177
Nikitin Point	224, 225	— general information	178, 179
Nikolaev	197	— Light	178
— Fort	187	— Sand Bank	183
— anchorage	187	— buoys	183
— prohibited anchorage	187	— caution	184
— range lights	188	— Lightbuoy	184
— general information	197,	— to Bosphorus	131
	198, 199, 200	— Dnepr Bay, directions	190
Nikolaevka	250	— Kherson Bay, directions	190
Nikolai, Fort	293	Oil, use of	13
Nikolo, Cape	142		



	Page.
Oirat village .....	208
Ok Meidan .....	38
Okjolar .....	34
Old Genoese Castle .....	118
— Seraglio .....	112, 113
— Point .....	64, 109, 110, 112
— Yeisk .....	249
Olen Hills .....	292
— Mount .....	290
Olympus .....	87
Oohan Aslan .....	53
Opasnaya .....	244
— Beach .....	239
— caution .....	244
Opuk, Mount .....	231
— anchorage .....	231
Oreanda Palace .....	225
Orchard Point .....	143
Ordu .....	305
— communication .....	305
Orman .....	136
Orsova .....	157
Orta Kiol .....	113, 114
— Point .....	104, 113, 114
Oschteu, Mount .....	285
Othman .....	112
Otuz .....	228
Ovajik .....	92
Ovidio Lake .....	174
Ovidiopol village .....	174
Oxia .....	102
Ozharsk Light .....	196
Ozerzik .....	276
— Roadstead .....	276

## P.

Pakhios Point .....	310
Palamda Reef .....	304
Palatia .....	80
— Bay .....	80
Patios Bay .....	72
Panaghia .....	273
— Cape .....	240, 241, 244, 273
— Rocks .....	241
Panagia .....	76
Panai Point Lighthouse .....	279
Panar Tepe .....	71, 72
Panderma .....	81, 82
— anchorage .....	81
— Bay .....	81
— coast .....	82
Pandjar Point .....	77

Panidos .....	58
Panticapaeum .....	236
Papas Point .....	119
Paphia Mount .....	138
Parium .....	66
Partenit village .....	226
Parutino village .....	194
Pasha Iskalessi .....	89
— Liman .....	68, 73, 74, 75, 76, 78, 79
— Harbor .....	74, 75
— Island .....	72
— Islands .....	76
Passau .....	155
Paul, Cape .....	233, 235
— Point .....	213
Paulo Bay .....	96
— Burnu .....	96
— Liman .....	96
Pavlocski Channel .....	241
Pavolsks Cape .....	241
Pavlovski Cape .....	233, 235, 244
— fog signal .....	235
— Channel .....	235, 243
— Lighthouse .....	235, 240, 243, 244
Pekli Cape .....	246
Penai Bank .....	278
— Point .....	277
— Light .....	279
— Lighthouse .....	278
Pendik .....	96, 97
— communication .....	96
Pendik Road .....	96
— anchorage .....	96
Pera .....	111, 113, 118
Peramo .....	81
— Bay .....	70, 73, 80, 81
Pereboini .....	260
— Island .....	261
Perekop Gulf .....	17, 203
— anchorage .....	202
— Beacon .....	202
— buoys .....	202
— fog signal .....	202
— Light .....	202
— water level .....	203
Pershemi .....	305
— Bay .....	305
Peschani .....	249, 251
— Bank .....	251
— Bay .....	218
— Islands .....	250
— Lightvessel .....	255, 262

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	Page.
Roksolyani village .....	174
Romaic .....	84
Rome .....	111
Rostov .....	249, 258, 260, 261
—— on-Don .....	259
—— communication .....	261
Roun Rock .....	76, 77
Rubanova Point .....	242
Rue Djami .....	112
—— Madresse .....	112
—— hospitals .....	112
Rumelia .....	138
Rumili .....	107, 133
—— Cape .....	119, 131, 132
—— Hissar .....	104, 115, 121
—— Light .....	116
—— Point .....	116
Rumili Kavak .....	118, 119, 124
—— Light .....	120
—— fog signal .....	104, 120
—— Lighthouse .....	131, 133
—— Lightvessel .....	133
Russian Steam Navigation Co. .....	237, 279
Rustchuk .....	149
Rvach Entrance .....	192
—— Lightvessel .....	191

**2.**

Sailing directions	6
Sakarleh, River	316
Saltik Liman Burnu	34 41 44
Samanli Dere	89-90
Sambek River	259
Sampson Rock	276
Samsun	308
— Bay	308
— communication	308
Samtredi	292
San Stefano	63
Sandal Ovasi	35
— Point	137
Sandy Islets	251
Sangarius	92
Sar Klol	56
Sargana Point	303
Sargonius	316
Sari Siglar Bay	25, 26, 29, 30, 44, 46
— Yar	118
Saribula Point	204
Sarich Point	222
— — Landmark	223
— — Light	222
Sarikalsk Point	194

	Page.
Sarileatl Cape	142
Save River	156
Sazalnîk Basin	249
—— Church	251
—— Pit	251
—— lifeboat	251
—— village	251
Sazkaveh Burnu	83
Scheskari Rock	278
Sebanjeh Lake	92
Seddul Bahr	21-22-43-45-46-47
—— Lighthouse	22
Seïdol Road	299
Selimyeh Barracks	55-63-99-100-120
Selvi Burnu	104-108, 122, 123
—— Rock	95
Semli Bakol	252
Semlin	156
Seraglio Point	54, 55, 101
Serai	112
Serpent Island	173
—— Light	174
Serveh Burnu	136, 137
Sestos Point	28, 44-46
Sevastopol	221, 222, 225, 230
—— Harbor	211
—— general information	211, 212, 213, 214, 215, 216
—— Town	216
—— general information	216, 217
Seven Firs	33
—— Towers	64, 110
—— Castle	109, 111
Shabeh Cape	151, 152
Shah Melik Liman	67
Shahim-Kalessi	22
Shapsukho	283
—— Bay	282
Shepherd's stone	222
Shilli	317
Sii	85
Sikli Vorthonas	97
Silivri	61
—— Bay	61
Simeis village	223
Simeon Channel	71
Simfis village	223
Singhol Point	155
Sinope	309, 310
—— Light	310
Sinub	310
—— Cape	309
—— communication	310

	Page.		Page.
Sinub Light.....	310	St. Nikolai .....	125
Sinyavka .....	259	— Fort .....	289
Sivash .....	269	— Peter .....	141
Siversov Lights.....	196	— Mount .....	223
Sivriji .....	90	— Simeon Hill .....	71
Sizepoll .....	140	— Triada .....	77
— Bay .....	141	— Zakhariah Church .....	206
Skadovsk .....	203	Stag's Leap .....	228
— anchorage .....	203	Stagshorn Point .....	267
— Basin .....	203	Stambul .....	64, 100, 111, 118
— Buoy .....	203	— Liman .....	112
— communication .....	203	Standard Petroleum Co.....	279
— range lights .....	203	Stanislav Cape .....	191
Skutari .....	55, 93, 99, 111, 113, 120	Stefano Cape .....	138
— Barracks .....	64	— Lighthouse .....	63
— Light .....	120	— Point .....	51, 53, 109, 110, 311
— Point .....	50	— anchorage .....	311
Sladkil Rivulet .....	247	— Light .....	63
Socha .....	285	— Shoal .....	63
— Bultkh Point .....	284, 285	Steuka Pass .....	157
— Light .....	284	Strelka .....	269
— Psta .....	284	Streletska Bay .....	218
— River .....	284	— Light .....	218
Sofia .....	149	— Shoal .....	218
Soldaya .....	227	Suan Dere .....	23
Solenaya River .....	266	Subeshik Bay .....	284
Sotera Roadstead .....	227	Submarine bells .....	9
Soundings .....	12	Sudak .....	228
South Bay .....	212	— Bay .....	227
— Center Island .....	75	— anchorages .....	227
— Road .....	238, 242	— coast .....	228
Southeast Aksef .....	240	— communications .....	228
Sowak .....	319	— Light .....	228
Sowakdere .....	320	— Point .....	227, 228
Spitfire Rock .....	145, 232	— life-saving station .....	228
St. Andrew's Cross .....	223	Sudzhuk .....	276
— Athanasius Valley .....	81	— Point .....	277, 279
— Basili, Cape .....	305	Sukala Point .....	142
— Constantine .....	138	Sukhaya Creek .....	215
— Demetri Cape .....	149, 150	Sukhum .....	228
— Duka Fort .....	285	— Bay .....	288
— Light .....	285	— communication .....	288
— Elias Cape .....	229	— Kale .....	237
— fogsignal .....	229	— Light .....	288
— Hill .....	229	— Point .....	287, 288
— George's anchorage .....	220	Suksu Point .....	287
— aspect .....	220	Sullman .....	118
— Bay .....	220	Sulina .....	163
— Cape .....	79, 220	— general information .....	163, 164, 165
— landmarks .....	220	— Lights .....	166
— Monastery .....	79, 220	— pilots .....	18
— reef .....	150	— Town .....	163

	Page.		Page.
Sultana Valideh Palace.....	115	Tartars.....	222, 230
Sultans Kiosk.....	123	Tash Dagb.....	89
— Valley.....	117, 122	— Dyryk.....	229, 230
Sumla.....	299	Tashkana Point.....	306, 307
Sungul.....	314	— Light.....	307
— Bay.....	313	Tbili Tskhali River.....	294
— Harbor.....	313	Tekeh.....	21
— regulations.....	313	Tekfur Dagb.....	58
— communication.....	314	Tekir Dagb.....	58
— Light.....	313	Telli, Fort.....	123
— supplies.....	314	— Point.....	104, 118
Surmena Bay.....	300	Temir Oba.....	271
Susurlu Chai.....	82	— Mount.....	244
SuvoruskI.....	244	Temriuk.....	246
— caution.....	244	— anchorage.....	247
Suvorov Light.....	188, 190	— Bank.....	246
Sweet Rivulet.....	247	— Bay.....	246
— waters of Asia.....	121	— buoy.....	246
— water of Europe.....	109	— church.....	247
<b>T.</b>		— Harbor light.....	247
		— works.....	247
Taganrog.....	251, 258	— Lake.....	246
— Bay.....	259	— Light.....	247
— caution.....	249	Tendra Bay.....	201
— channel.....	251	— anchorage.....	201
— communication.....	258	— buoys.....	201
— Gulf.....	249, 259, 262	— caution.....	202
— Light.....	257	— Peninsula.....	200, 201
— Lighthouse.....	252	— beacons.....	201
— port.....	257	— caution.....	201
— road.....	256	— fog signal.....	201
Tahirova.....	69	— Light.....	201
Takil, Cape.....	232, 233, 234, 244	— signal station.....	201
— coast.....	234	Tenedos Channel.....	41
Taman.....	236, 242, 274	Tenginskoe.....	282
— Island.....	273	Tent Mountain.....	227
Taman Lake.....	231, 242	Tereboli.....	303
— buoys.....	242	— communication.....	304
— telegraph cable.....	236	— Light.....	304
Tamulsh River.....	289	Termeh River.....	307
Tarabozun Bay.....	301	Terrible Rock.....	210
Tarkan Point.....	271	Tersana Burnu.....	137
Tarkhan, Cape.....	207	Theiss River.....	157
— Bank.....	207	Theodosia ..	224, 228, 229, 230, 231, 280
— currents.....	207	— Bay.....	269
— fog signal.....	207	— coal.....	230
— signal station.....	207	— Gulf.....	229
— storm signals.....	207	— lifeboat.....	230
— winds.....	207	— Light.....	230
Tarsana.....	49	— Point.....	230
— Burnu.....	66	— quarantine.....	230
— Cape.....	65	— supplies.....	230

	Page.		Page.
Therapa	117	Tulcha	169
Therapia	106, 112, 117, 122	— anchoring	169
— Bay	116	— caution	169
Three-fathom Rock	71	— hospitals	169
Tichorezkala Junction	280	— mooring	169
Tidal currents	7	— River level	169
Tide Tables	8	Tutun Liman	93
Tides	7	Tuz Burnu	95, 96, 102
Tiflis	292	Tuzla	50, 238, 244
Tiligulsk Lake	184	— bank	235, 241
Timiteia, Fort of	273	— anchorage	242
— Peninsula	273	— buoys	241
Tirnova	143, 149	— fog signal	241
Tiluvieuse Point	280, 281	Tuzla Bay	95
Tolstoi	286	— anchorage	95
— Point	286, 287	Tugla Burnu	87
Tonka	267	— Cape	152, 153, 240, 241, 273
Topche Bay	90	— coast	153
— anchorage	90	— fog signal	153, 241
— Iskalessi	90	— shoal	153
Topchu Burnu	70	— lightvessel	241, 243
Tophkana	110, 113	— Mount	283
— Arsenal	110, 114	Tuzla Pit	244
Tortoise Island	256	— point	283
Towshan Ada	70, 71	— Spit	233, 241
— Point	33	— beacon	241, 243
— Tepe	96	— light buoy	241
Townshanjik	94	Tuzla village	95
Trajangs Wall	153	— water	95
Trebizond	301, 308	Tuzli	66, 67
— Bay	301	— Islet	66
— communications	301	Tuzlo Lightvessel	233
— Light	302	Tzemess River	277
— winds	302	Tzemesski	278, 279
Tree Peak	45		
Trias Cape	141, 142		
Triklinos Rock	61		
Trilia	85		
Tripoli	303		
Trutaeva Bank	183, 249		
Tsarigrad Mouth	174		
— Beacon	175		
— Buoy	175		
— lifeboat	175		
Tu anchorage	283		
— Cove	283		
Tuak Roadstead	227		
Tuapse Bay	283		
— communication	283		
— Lights	283		
— Port	284		
Tula, Government of	260		

## U.

Uch Burnu	95
Ulfer Chai	86
Ulgar Dere	29
— Kiol	29
— River	29
Ulm	155
Umar Bank	122, 123
— Light	123
Umur Bay	104, 123
— Point	122
Unlah	307
Unleh	307
— Bay	307
Unkiar Skalessi	122
Upper Viktorovka Light	190
Upper Volosh Light	195

	Page.
Uret Point.....	208
— coast.....	208
Urzuf.....	225
— road.....	225
— anchorage.....	225
Uskiut Roadstead.....	227
Uskudar.....	120
Utgu Burnu.....	85
Utlyuk Liman.....	267
Utrish Point.....	276
— Light.....	276
Utrishenok.....	276
Utze Keupri Dere.....	36
Uzun Burnu.....	29
Uzunga Burnu.....	133

## V.

Vanikloi Bay.....	121
Varada Mountains.....	277
Varna.....	143, 149
— Bay.....	148, 150
— Light.....	149
Varvatzi.....	255
Vasiliko Harbor.....	138
Vassalskaya Channel.....	201
Vathi Bay.....	73
— coast.....	73
Vavara.....	83
Velar Burnu.....	81
Velyaminov.....	283
Venedek Tash.....	59
Venetico Point.....	80
Verbki Island.....	191
Veselo Voznesensk.....	255
Vesuvius Rocks.....	263
Vilkov.....	172
Viper Rock.....	240
Vladimir Battery.....	215
Voenni Gorodok.....	297
— Mole.....	179
Volchek Light.....	173
Volga River.....	260
Volga-Don Steamship Co.....	269
Voll Point.....	76, 77
— Spit Light.....	196
Volosh Point.....	189
Volski.....	240
Vona Bay.....	305
— anchorage.....	306
— Point.....	305
— Light.....	306

	Page.
Vorontzooski Lighthouse.....	179
— Molehead Lighthouse.....	178
Vorthonas.....	97
Voznasensk.....	199
Vulan Bay.....	282

## W.

Waitzen.....	156
West Bay.....	84, 85
— Channel.....	279
— Pass.....	75, 76
White Point.....	147
Wrangler Patch.....	270

## Y.

Yalak Dere.....	91
Yali Kiri.....	121
— Tarla.....	134
Yalipliman.....	76
Yalova.....	89
— anchorage.....	89
Yalova.....	27
Yalta.....	223, 225
— Bay.....	224
— communication.....	225
— lifeboat.....	225
— Light.....	225
— Road.....	224
— Harbor.....	224
— storm signals.....	225, 230, 263
Yamboli.....	143
— River.....	301
Yapildak Chai.....	34
— River.....	33
Yaremdji.....	94
Yarullgach Bay.....	205
— Light.....	206
Yassi Burnu.....	88
Yasun, Cape.....	306
Yedi Kule.....	64
Yelsk.....	249-250
— communication.....	250
— Gulf.....	249
— Harbor.....	250
— lifeboat.....	250
— Light.....	250
— Liman.....	249
— southern shore.....	249
— piers.....	250
— River.....	249





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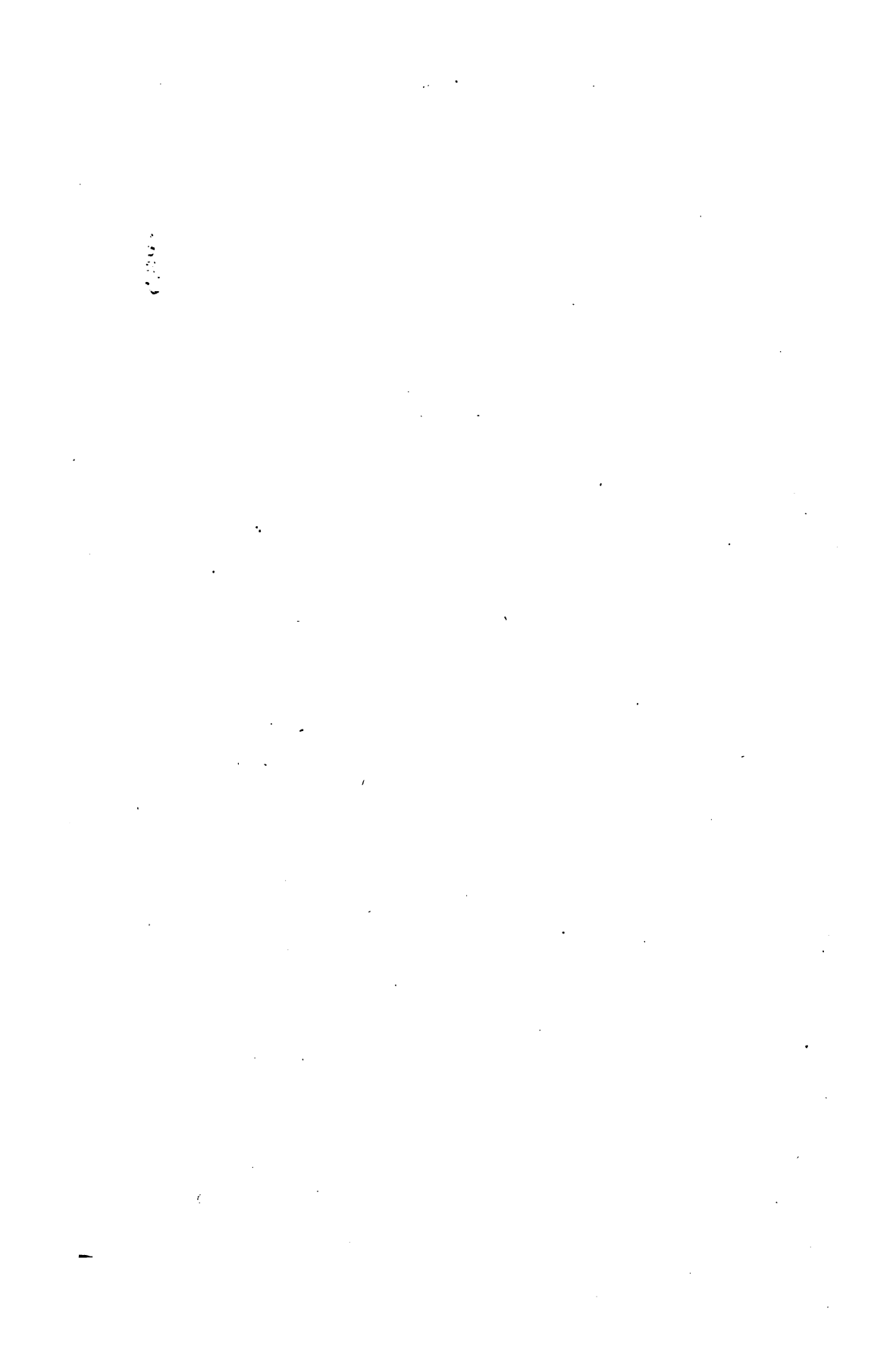
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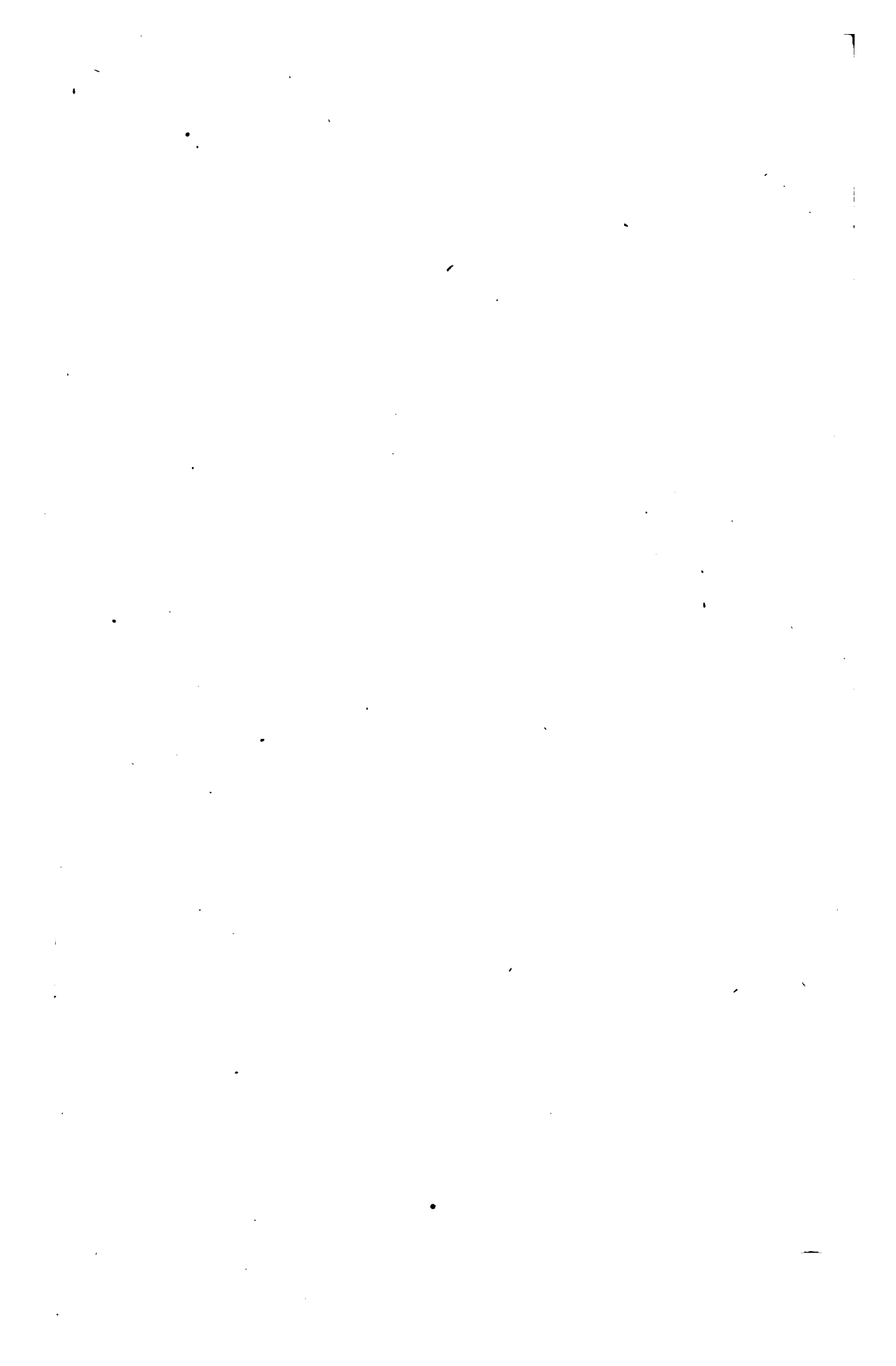
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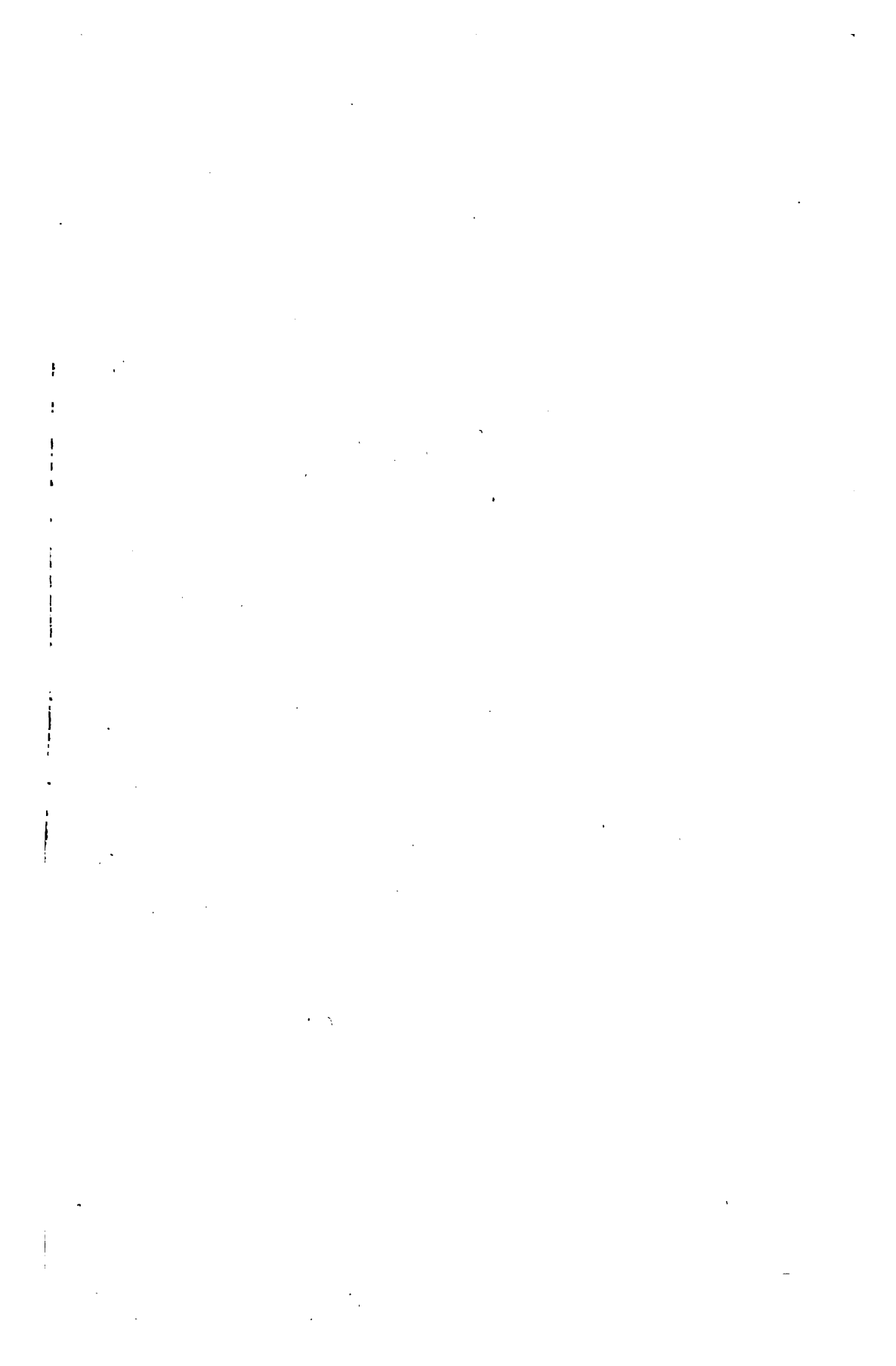
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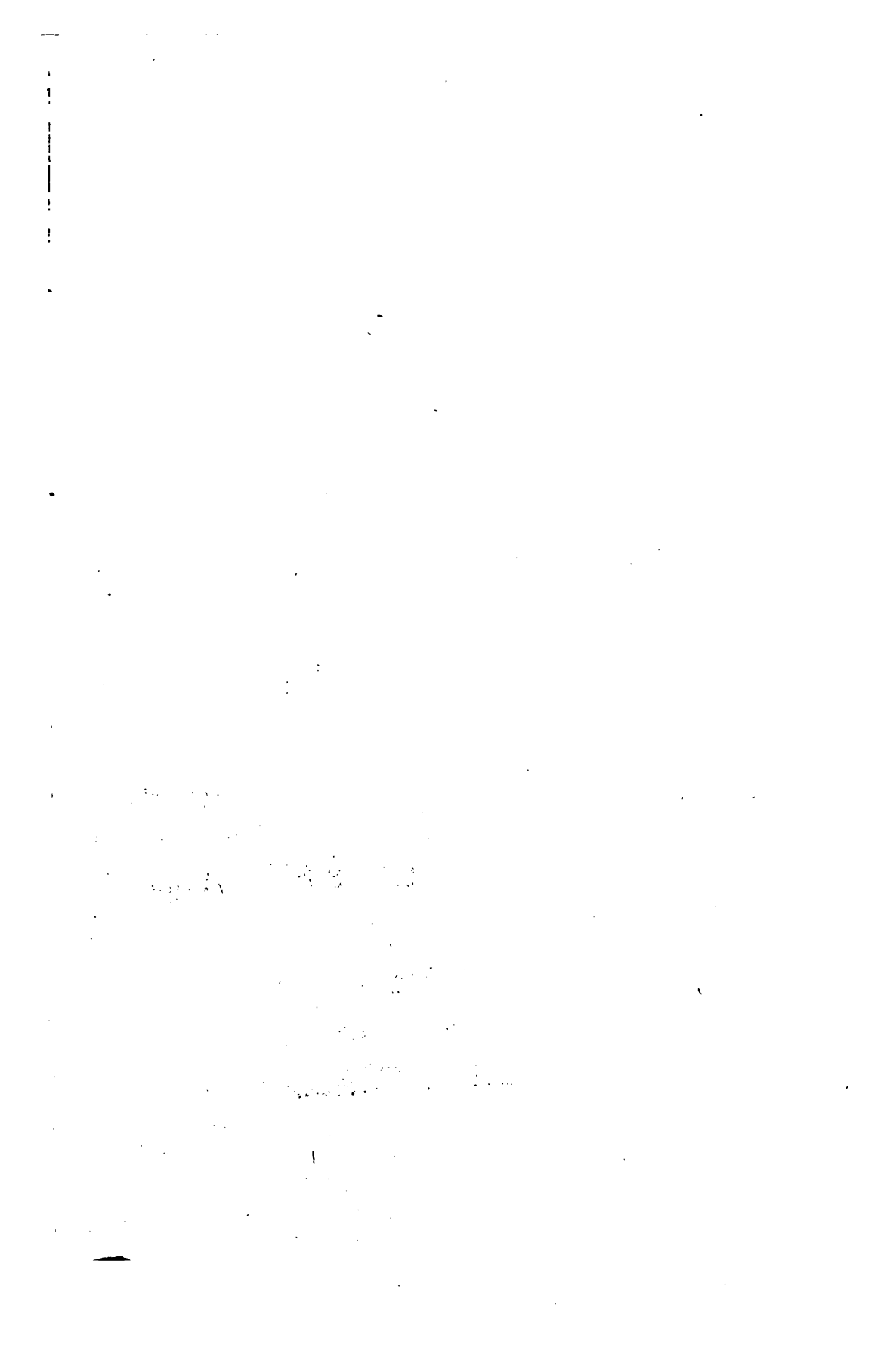




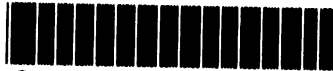










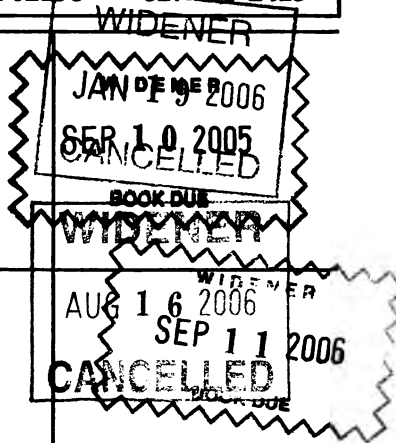


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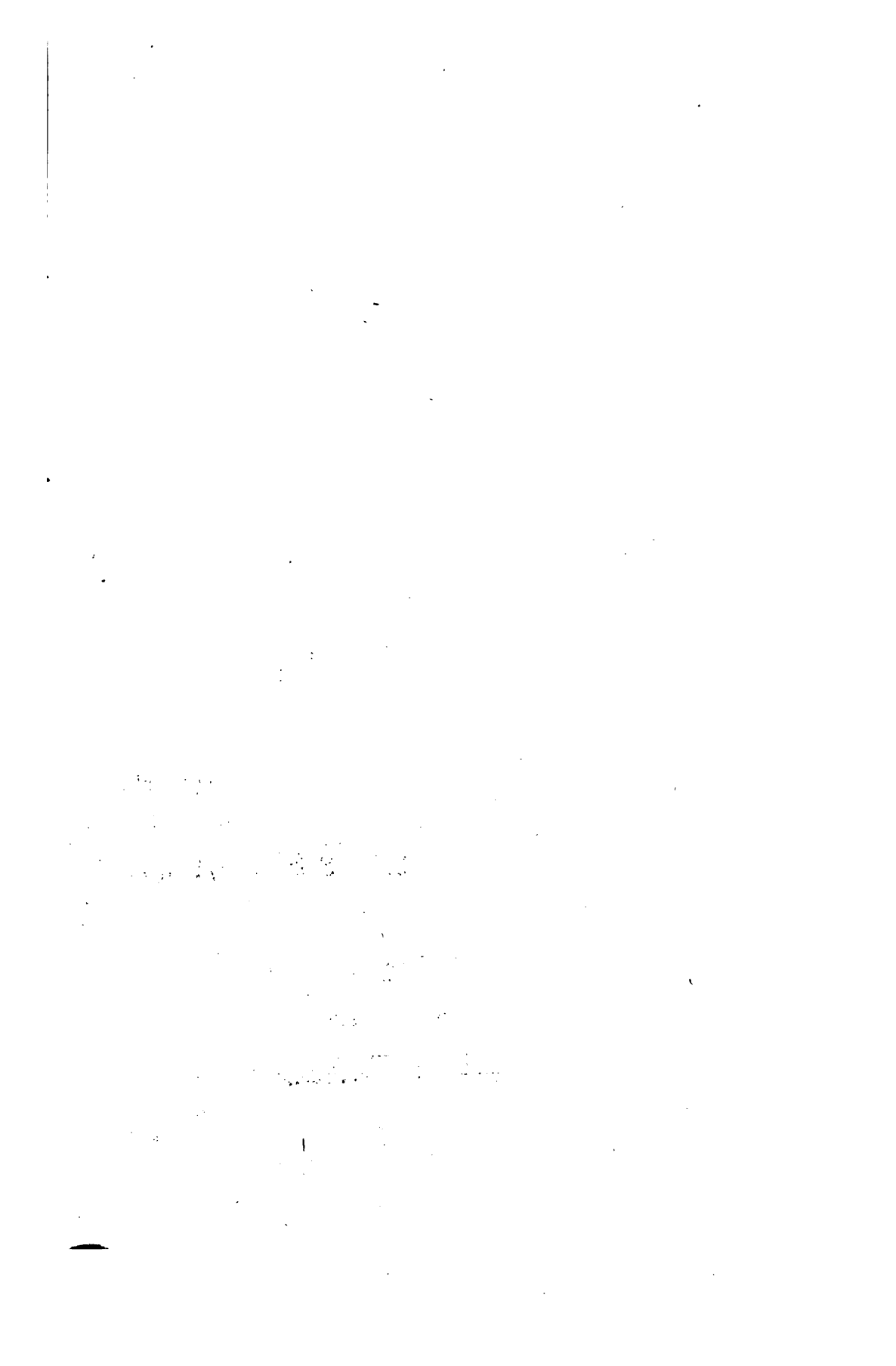
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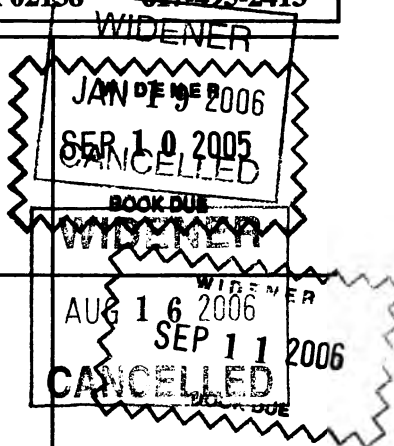


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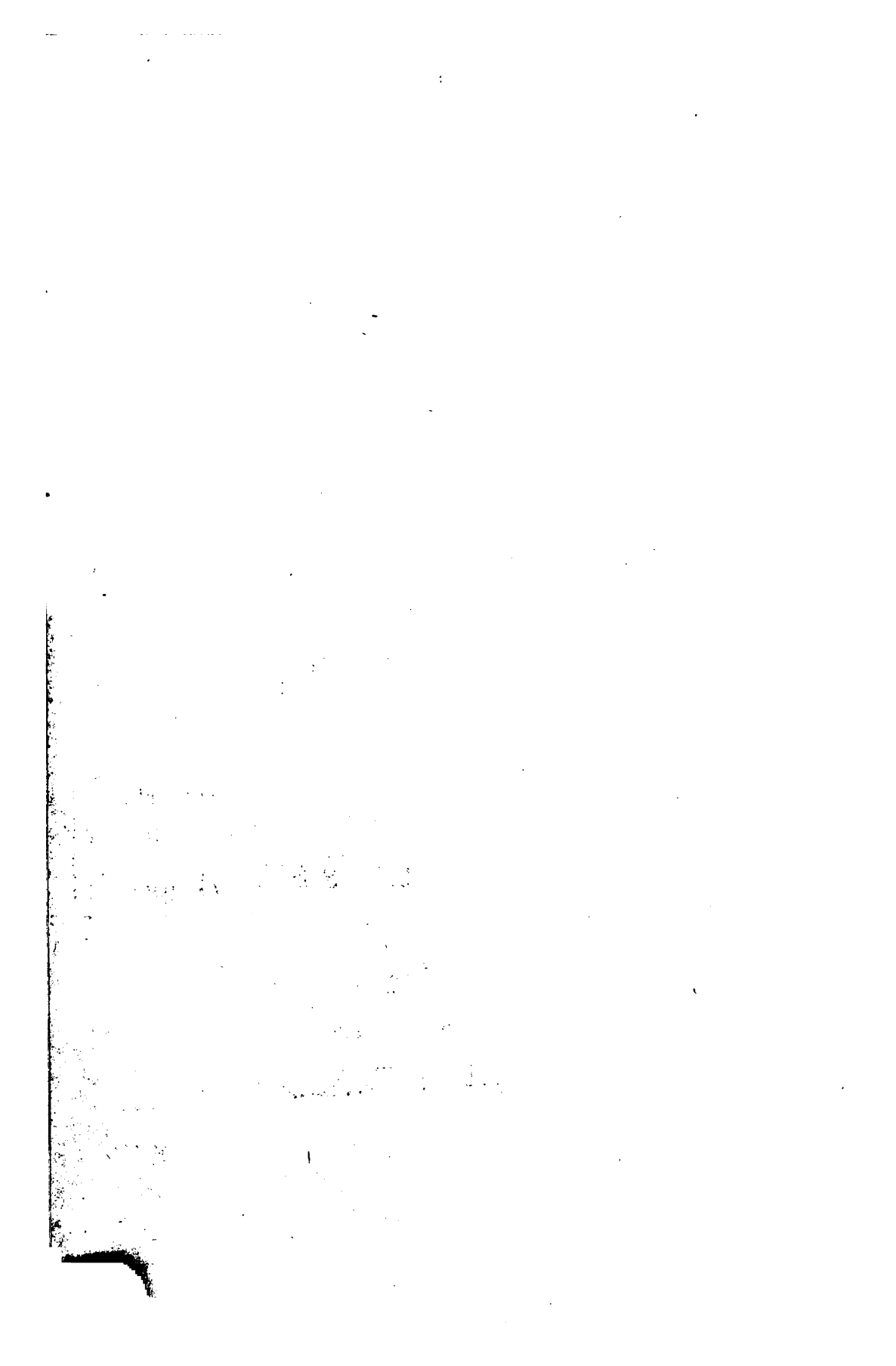
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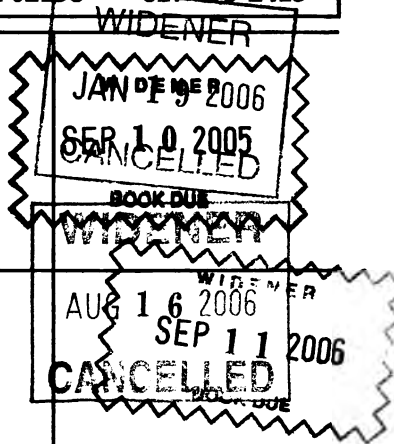


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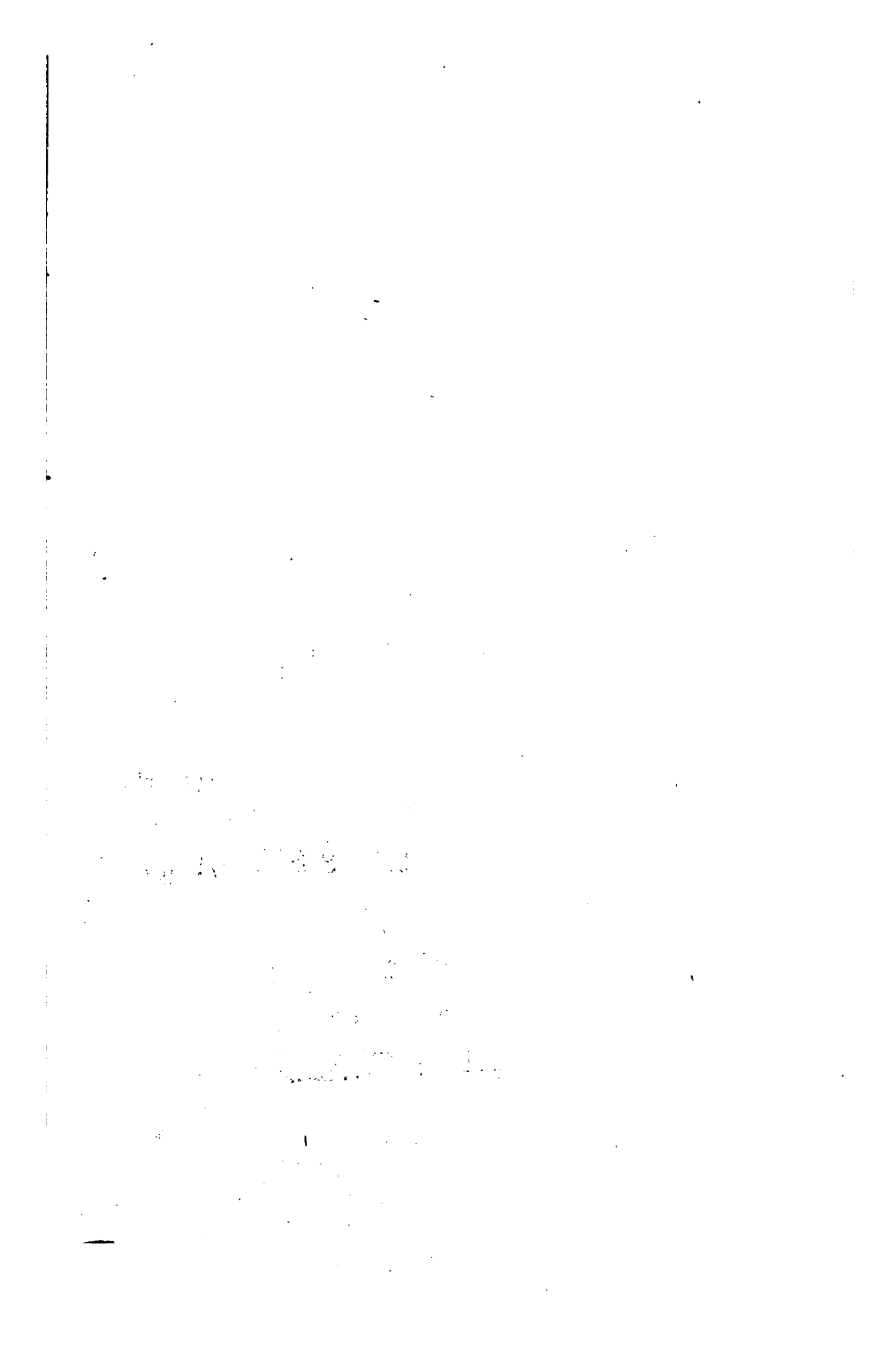
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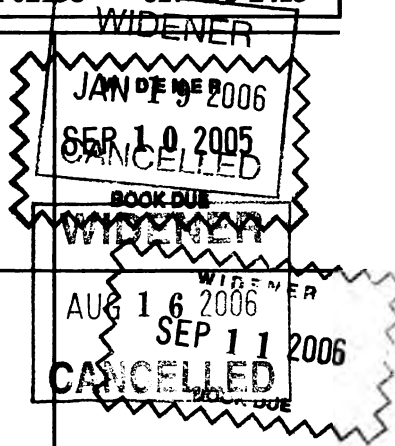


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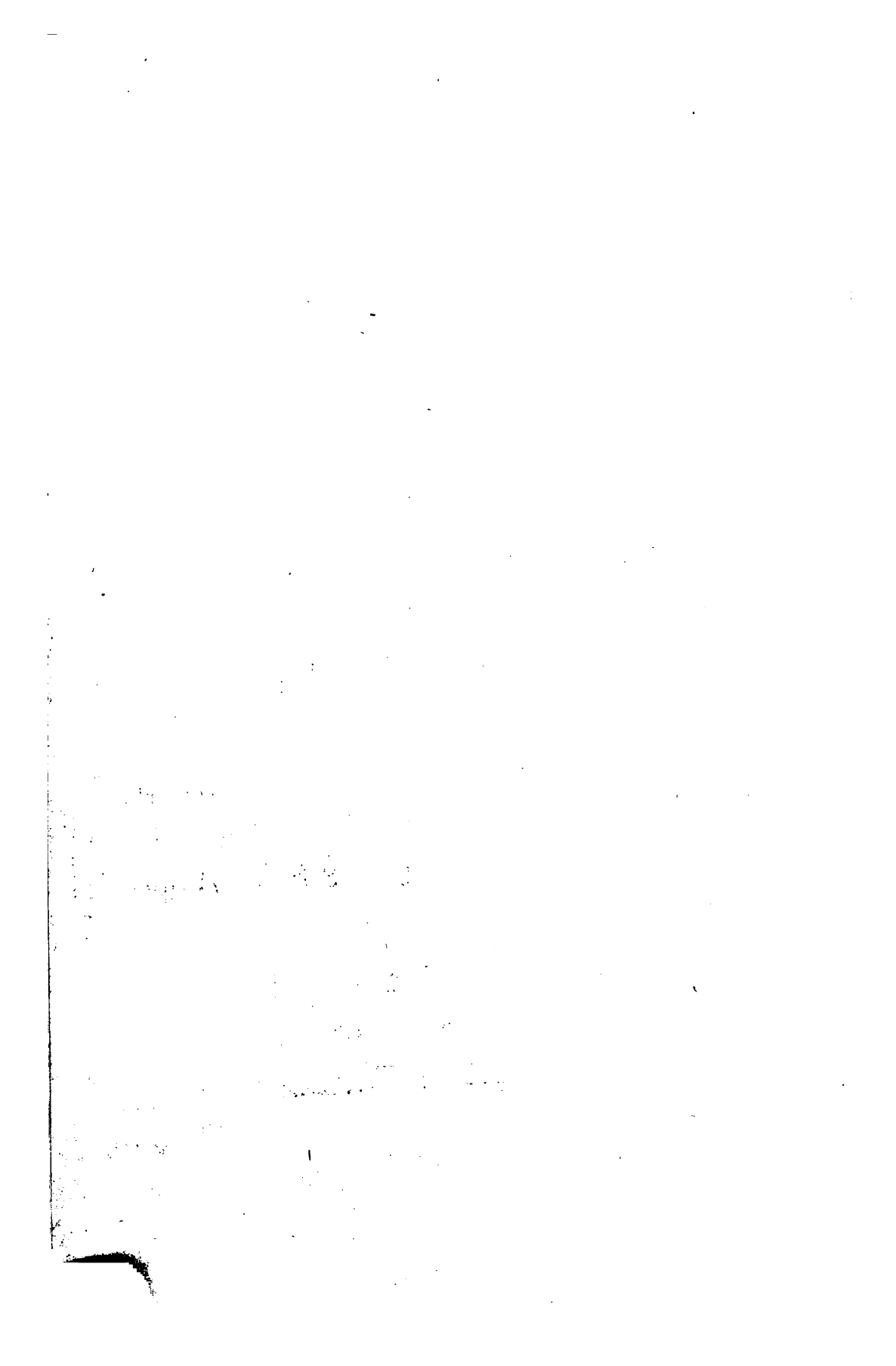
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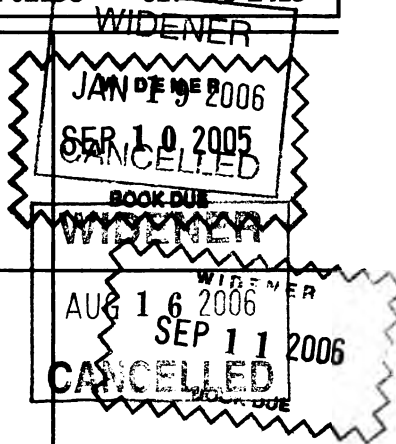


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